Vol. 1085 Number 4

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UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

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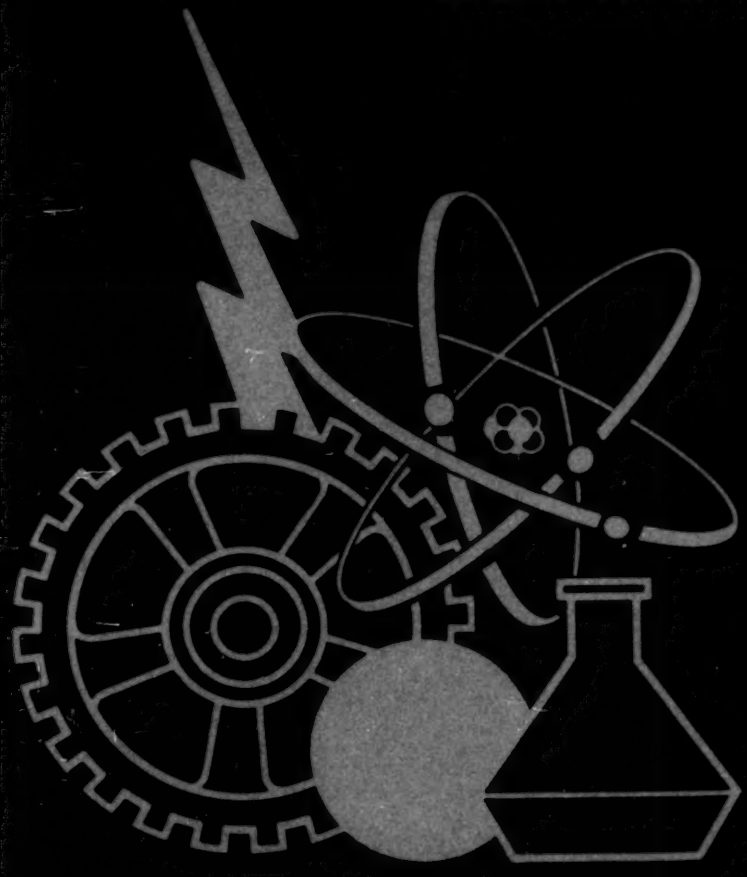

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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987, and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

Note that national stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office are also included below for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Nov. 17, 1987.

Patent Cooperation Treaty (PCT) Update

Translation of the International Preliminary Examination Report (IPER) into Russian no longer required, Withdrawal by Japan of the reservation concerning filing a translation of the international application by 20 months and Number of Demands received by the IPEA/EP from U.S. applicants.

Translation of the IPER into Russian no longer required

The following information was released by the World Intellectual Property Organization (WIPO) on July 17, 1987.

Pursuant to PCT Rule 72.1 the USSR State Committee for Inventions and Discoveries has informed the International Bureau of a change in the languages into which it requires a translation of the International Preliminary Examination Report (IPER) by the International Bureau.

> As from July 8, 1987, a translation of the IPER into Russian will no longer be required if the IPER has been established in English . . . .

Consequently, as of July 8, 1987, the payment of a multiple of the handling fee under PCT Rule 57.2(a) for a translation into Russian is no longer required if the Soviet Union is elected in demand for International Preliminary Examination filed in English. Nor will the supplement to the handling fee under PCT Rules 57.1(b) and 57.2(b) apply if the Soviet Union is elected in a later election under PCT Rule 56 filed with the International Bureau on or after July 8, 1987.

Withdrawal by Japan of the reservation concerning filing a translation of the International application by 20 months from the priority date

On Sept. 16, 1987, WIPO announced that on Sept. 8, 1987, the Government of Japan notified the withdrawal of the declaration made by it under PCT Article 64(2)(a) concerning the time limit applicable under Chapter II of the PCT for the furnishing of a translation of the international application. Thus, Japan will become bound by the provisions of PCT Chapter II without any reservations on Dec. 8, 1987.

Pursuant to the said declaration, the translation of an international application into Japanese must at present be furnished to the Japanese Patent Office in all cases within 20 months from the priority date.

The withdrawal of the said declaration has the effect that, as from Dec. 8, 1987, the provisions of PCT Article 39 (1)(a) (under which a translation of the international application into Japanese must be furnished within 30 months from the priority date) will apply in respect of the Japanese Patent Office as elected Office.

This 30 month time limit applies also to international applications which have been filed before Dec. 8, 1987, provided that Japan has been elected in a demand for international preliminary examination or in a later election prior to the expiration of the 19th month from the priority date *and* that on Dec. 8, 1987, 20 months from the priority date have not expired.

Number of demands for International Preliminary Examination filed by U.S. applicants with the European Patent Office as International Preliminary Examining Authority (IPEA/EP) as of Oct. 31, 1987

Pursuant to the Memorandum of Understanding between the European Patent Office (EPO) and the USPTO concerning monitoring Demands submitted to the IPEA/EP by U.S. applicants, published at 1080 O.G. 2 on July 7, 1987, the number of Demands filed by U.S. applicants (who filed their international applications with the United States Receiving Office) with the IPEA/EP as of Oct. 31, 1987 was 70.

DONALD J. QUIGG,
Nov. 17, 1987. *Assistant Secretary and Commissioner of Patents and Trademarks.*

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filedon or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on December 18, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,488,313 through 4,489,442
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge

are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED OCTOBER 4, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,407,026	06/405,157	10/4/83
4,407,031	06/223,147	10/4/83
4,407,046	06/321,438	10/4/83
4,407,068	06/357,847	10/4/83
4,407,069	06/328,651	10/4/83
4,407,072	06/321,129	10/4/83
4,407,076	06/311,409	10/4/83
4,407,077	06/304,059	10/4/83
4,407,079	06/269,407	10/4/83
4,407,080	06/279,549	10/4/83
4,407,081	06/328,129	10/4/83
4,407,083	06/355,854	10/4/83
4,407,085	06/308,427	10/4/83
4,407,086	06/265,906	10/4/83
4,407,088	06/279,823	10/4/83
4,407,090	06/299,414	10/4/83
4,407,099	06/246,572	10/4/83
4,407,103	06/375,389	10/4/83
4,407,107	06/258,871	10/4/83
4,407,113	06/273,468	10/4/83
4,407,115	06/284,574	10/4/83
4,407,130	06/275,322	10/4/83
4,407,142	06/304,460	10/4/83
4,407,148	06/245,416	10/4/83
4,407,151	06/282,717	10/4/83
4,407,160	06/250,668	10/4/83
4,407,166	06/251,739	10/4/83
4,407,169	06/354,068	10/4/83
4,407,180	06/264,700	10/4/83
4,407,186	06/250,939	10/4/83
4,407,188	06/253,531	10/4/83
4,407,204	06/324,745	10/4/83
4,407,207	06/445,827	10/4/83
4,407,212	06/314,683	10/4/83
4,407,218	06/409,650	10/4/83
4,407,223	06/338,642	10/4/83
4,407,236	06/303,698	10/4/83
4,407,237	06/372,997	10/4/83
4,407,245	06/294,077	10/4/83
4,407,247	06/313,630	10/4/83
4,407,249	06/260,957	10/4/83
4,407,250	06/225,166	10/4/83
4,407,251	06/290,075	10/4/83
4,407,253	06/247,445	10/4/83
4,407,256	06/322,405	10/4/83
4,407,261	06/334,447	10/4/83
4,407,264	06/326,538	10/4/83
4,407,266	06/286,616	10/4/83
4,407,268	06/341,257	10/4/83
4,407,269	06/227,195	10/4/83
4,407,275	06/322,966	10/4/83
4,407,305	06/409,275	10/4/83
4,407,316	06/294,564	10/4/83
4,407,318	06/303,779	10/4/83
4,407,337	06/406,882	10/4/83
4,407,338	06/217,760	10/4/83
4,407,342	06/267,735	10/4/83
4,407,348	06/278,510	10/4/83
4,407,349	06/249,088	10/4/83
4,407,351	06/370,816	10/4/83
4,407,355	06/242,127	10/4/83
4,407,360	06/330,688	10/4/83
4,407,370	06/240,986	10/4/83
4,407,371	06/278,716	10/4/83
4,407,390	06/291,025	10/4/83
4,407,391	06/368,301	10/4/83
4,407,397	06/306,181	10/4/83
4,407,398	06/253,674	10/4/83
4,407,409	06/361,530	10/4/83
4,407,411	06/391,549	10/4/83
4,407,413	06/405,721	10/4/83
4,407,417	06/219,248	10/4/83
4,407,421	06/331,420	10/4/83
4,407,424	06/394,231	10/4/83
4,407,426	06/253,304	10/4/83
4,407,429	06/370,648	10/4/83
4,407,430	06/254,853	10/4/83
4,407,435	06/341,315	10/4/83
4,407,440	06/236,994	10/4/83
4,407,456	06/248,314	10/4/83
4,407,457	06/326,091	10/4/83
4,407,460	06/246,307	10/4/83
4,407,474	06/296,946	10/4/83
4,407,475	06/231,939	10/4/83
4,407,484	06/321,339	10/4/83
4,407,487	06/341,702	10/4/83
4,407,494	06/294,762	10/4/83
4,407,497	06/335,359	10/4/83
4,407,502	06/307,968	10/4/83
4,407,503	06/285,738	10/4/83
4,407,504	06/286,031	10/4/83
4,407,510	06/320,950	10/4/83
4,407,516	06/449,353	10/4/83
4,407,522	06/474,435	10/4/83
4,407,523	06/338,421	10/4/83
4,407,531	06/248,063	10/4/83
4,407,536	06/235,167	10/4/83
4,407,549	06/272,346	10/4/83
4,407,550	06/245,481	10/4/83
4,407,551	06/269,128	10/4/83
4,407,560	06/277,127	10/4/83
4,407,575	06/323,790	10/4/83
4,407,589	06/234,225	10/4/83
4,407,596	06/268,536	10/4/83
4,407,608	06/287,526	10/4/83
4,407,610	06/341,067	10/4/83
4,407,614	06/223,837	10/4/83
4,407,626	06/229,868	10/4/83
4,407,630	06/321,268	10/4/83
4,407,637	06/227,183	10/4/83
4,407,642	06/228,043	10/4/83
4,407,646	06/354,457	10/4/83
4,407,680	06/361,852	10/4/83
4,407,686	06/322,314	10/4/83
4,407,687	06/400,535	10/4/83
4,407,697	06/365,523	10/4/83
4,407,698	06/248,867	10/4/83
4,407,701	06/404,534	10/4/83
4,407,705	06/263,629	10/4/83
4,407,709	06/363,777	10/4/83
4,407,712	06/383,882	10/4/83
4,407,715	06/316,077	10/4/83
4,407,716	06/271,551	10/4/83
4,407,724	06/252,981	10/4/83
4,407,734	06/291,685	10/4/83
4,407,737	06/340,888	10/4/83
4,407,763	06/309,321	10/4/83
4,407,764	06/298,056	10/4/83
4,407,773	06/309,792	10/4/83
4,407,775	06/258,076	10/4/83
4,407,777	06/285,797	10/4/83
4,407,784	06/312,646	10/4/83
4,407,797	06/406,980	10/4/83
4,407,800	06/317,547	10/4/83
4,407,805	06/393,808	10/4/83
4,407,812	06/226,774	10/4/83
4,407,815	06/233,180	10/4/83
4,407,831	06/224,718	10/4/83
4,407,833	06/416,695	10/4/83
4,407,837	06/358,138	10/4/83
4,407,841	06/315,921	10/4/83
4,407,842	06/370,382	10/4/83
4,407,858	06/335,587	10/4/83
4,407,861	06/403,867	10/4/83
4,407,865	06/271,890	10/4/83

Patent Number	Serial Number	Issue Date
4,407,918	06/348,839	10/4/83
4,407,935	06/339,816	10/4/83
4,407,947	06/302,022	10/4/83
4,407,958	06/328,847	10/4/83
4,407,967	06/240,931	10/4/83
4,407,975	06/352,863	10/4/83
4,407,976	06/271,882	10/4/83
4,407,977	06/380,071	10/4/83
4,407,982	06/345,616	10/4/83
4,407,997	06/313,290	10/4/83
4,408,014	06/376,530	10/4/83
4,408,041	06/321,311	10/4/83
4,408,045	06/361,308	10/4/83
4,408,053	06/405,965	10/4/83
4,408,056	06/454,300	10/4/83
4,408,063	06/369,724	10/4/83
4,408,068	06/342,584	10/4/83
4,408,074	06/317,517	10/4/83
4,408,076	06/299,413	10/4/83
4,408,092	06/345,897	10/4/83
4,408,095	06/239,877	10/4/83
4,408,100	06/239,347	10/4/83
4,408,102	06/257,596	10/4/83
4,408,103	06/337,228	10/4/83
4,408,111	06/267,955	10/4/83
4,408,114	06/336,955	10/4/83
4,408,139	06/284,575	10/4/83
4,408,142	06/265,401	10/4/83
4,408,149	06/300,391	10/4/83
4,408,154	06/298,833	10/4/83
4,408,157	06/260,303	10/4/83
4,408,170	06/315,533	10/4/83
4,408,174	06/330,109	10/4/83
4,408,198	06/302,160	10/4/83
4,408,221	06/304,588	10/4/83
4,408,227	06/269,796	10/4/83
4,408,233	06/357,541	10/4/83
4,408,255	06/224,319	10/4/83
4,408,258	06/325,515	10/4/83
4,408,261	06/340,235	10/4/83
4,408,264	06/399,327	10/4/83
4,408,266	06/252,364	10/4/83
4,408,268	06/406,651	10/4/83
4,408,287	06/266,345	10/4/83
4,408,311	06/261,514	10/4/83
4,408,332	06/260,617	10/4/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,176,316, Re. S.N. 004,369, Filed Jan. 15, 1987, Cl. 380/32, SECURE SINGLE SIDEBAND COMMUNICATION SYSTEM USING MODULATED NOISE SUBCARRIER, Louis A. De Rosa, et al., Owner of Record: *International Telephone & Telegraph Corp., Nutley, N.J.,* Attorney or Agent: Paul W. Hemminger, et al., Ex. Gp.: 222

4,520,702, Re. S.N. 072,987, Filed July 14, 1987, Cl. 358/106, OPTICAL INSPECTION APPARATUS FOR MOVING ARTICLES, Malcolm W. Randall, Owner of Record: *Key Technology, Inc., Milton-Free Water, Oreg.* Attorney or Agent: Richard J. St. John, et al., Ex. Gp.: 262

4,528,428, Re. S.N. 072,108, Filed July 9, 1987, Cl. 200/5A, KEY-HOLDING STRUCTURE OF KEYBOARD WITH CURVED OPERATING SURFACE OF KEYS, Hideo Gotoh, et al., Owner of Record: *Brothers Kogyo Kabushiki Kaisha, Aichi Ken, Japan,* Attorney or Agent: Roger W. Parkhurst, et al., Ex. Gp.: 214

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,287,923, Reexam. No. 90/001,373, Requested: Nov. 12, 1987, Cl. 81/429, SCREWING HEADS, Ewald Hornung, Owner of Record: *Feinwukhau Helfer & Co., Rinteln, Germany,* Attorney or Agent: Larson, Taylor, et al., Ex. Gp.: 320, Requester: Vermont American Corp., Louisville, Ky.

4,517,741, Reexam. No. 90/001,374, Requested: Nov. 12, 1987, Cl. 30/162, KNIFE WITH PLURAL REPLACABLE BLADE STORAGE AND MEANS FOR SINGLE BLADE EXTENSION, James M. Castelluzo, Owner of Record: *Inventor, New York, N.Y.,* Attorney or Agent: Thomas M. Morrison, Ex. Gp.: 320, Requester: Vermont American Corp., Louisville, Ky.

4,592,230, Reexam. No. 90/001,372, Requested: Nov. 6, 1987, Cl. 73/295, APPARATUS AND METHOD OF DETERMINING THE LIQUID COOLANT LEVEL IN A NUCLEAR REACTOR, James P. Waring, et al., Owner of Record: *Scanpower, Inc., Bethesda, Md.,* Attorney or Agent: Eric P. Schellin, Ex. Gp.: 240, Requester: Fluid Components Inc., San Marcos, Calif.

4,688,092, Reexam. No. 90/001,375, Requested: Nov. 10, 1987, Cl. 358/109, SATELLITE CAMERA IMAGE NAVIGATION, Ahmed A. Kamel, et al., Owner of Record: *Ford Aerospace & Communications Corp., Palo Alto, Calif.,* Attorney or Agent: Edward Radlo, Ex. Gp.: 260, Requester: Owner

Errata

"All reference to Patent No. 4,707,164 to Robert S. Harris of Ind. for 'VAPOR RECOVERY SYSTEM' appearing in the Official Gazette of Nov. 17, 1987 should be deleted since no patent was granted."

"All reference to Patent No. 4,708,262 to George W. Ford, Jr. of Utah for 'FOAMER AND METHOD' appearing in the Official Gazette of Nov. 24, 1987 should be deleted since no patent was granted."

"All reference to Patent No. 4,709,338 to Roosevelt A. Fernandes of N.Y. for 'ELECTRICAL POWER LINE AND SUBSTATION MONITORING APPARATUS AND SYSTEM appearing in the Official Gazette of Nov. 24, 1987 should be deleted since no patent was granted."

PATENT NOTICES

Certificates of Correction for the Week of Dec. 22, 1987

Re. 32,359	4,648,394	4,670,299	4,680,463
4,265,979	4,649,147	4,670,943	4,681,014
4,280,930	4,649,876	4,671,584	4,681,124
4,398,029	4,650,216	4,671,820	4,681,189
4,461,769	4,651,670	4,671,953	4,681,348
4,462,508	4,653,719	4,672,372	4,682,220
4,465,905	4,654,273	4,672,588	4,682,787
4,548,607	4,654,367	4,672,829	4,682,953
4,577,481	4,656,310	4,673,630	4,683,146
4,578,491	4,661,701	4,673,787	4,683,492
4,579,798	4,661,932	4,673,834	4,684,292
4,585,318	4,663,011	4,674,710	4,684,454
4,585,597	4,663,475	4,675,194	4,684,676
4,594,323	4,663,507	4,675,678	4,684,704
4,616,279	4,663,731	4,675,692	4,684,731
4,618,733	4,664,805	4,676,027	4,685,860
4,631,116	4,665,993	4,676,132	4,686,378
4,632,236	4,666,002	4,676,227	4,686,516
4,635,073	4,666,044	4,676,675	4,687,049
4,638,078	4,666,166	4,676,804	4,688,493
4,640,632	4,666,442	4,676,977	4,688,557
4,640,690	4,666,456	4,677,305	4,688,650
4,642,188	4,666,609	4,677,668	4,688,865
4,642,672	4,668,166	4,678,232	4,689,131
4,643,895	4,668,228	4,678,387	4,689,256
4,645,186	4,668,502	4,678,476	4,689,424
4,645,618	4,668,608	4,678,872	4,689,791
4,646,002	4,668,961	4,679,542	4,690,929
4,646,270	4,669,746	4,680,205	4,695,514
4,647,699	4,670,099	4,680,343	

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	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
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	Cleveland Public Library	(216) 623-2870
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	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF November 21, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	9-11-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-14-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-15-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	5-12-86
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	5-06-86
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	5-02-86
DESIGN, GROUP 290—K. L. CAGE, Director	1-18-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	9-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	2-06-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-02-87

Expiration of patents: The patents within the range of numbers indicated below expire during November 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents . . . . . Numbers 3,537,107 to 3,543,307, inclusive

Plant Patents . . . . . Numbers 2,996 to 3,007 inclusive

REEXAMINATIONS

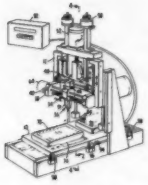
DECEMBER 22, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,555,957 (800th)
BI-DIRECTIONAL LIQUID SAMPLE HANDLING SYSTEM

Arthur E. Frankel, Palo Alto; Larry J. Johnson, San Jose, and Timothy J. Wennberg, San Francisco, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Reexamination Request No. 90/001,182, Mar. 6, 1987.
Reexamination Certificate for Patent No. 4,555,957, issued Dec. 3, 1985, Ser. No. 542,113, Oct. 14, 1983.
Int. Cl.[4] G01N *35/06*
U.S. Cl. 73—864.14



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–11** is confirmed.

1. A machine for automatically transferring at least a portion of a liquid sample in one receptacle to another receptacle, comprising:

a head assembly translatable between upper and lower positions along a vertical axis;

means for moving said head assembly along said vertical axis;

at least one pipette assembly mounted on said head assembly for movement therewith along said vertical axis and for movement in a single first horizontal axis, said pipette assembly including a support block carried on a first horizontal guide member and a pipette nozzle mounted on said support block and having a depending end for receiving tips, a slide block carried on a second horizontal guide member parallel to the first guide member, a plunger mounted on said slide block and depending within said pipette nozzle, and means for moving said plunger within said pipette nozzle to vary the internal volume of said nozzle and a tip supported thereby;

means for moving said pipette assembly relative to said head assembly along said first horizontal axis;

a table mounted beneath said head for translation along a second horizontal axis that is transverse to the first horizontal axis, said table having at least two work stations spaced along its axis of translation for respectively accommodating at least one tray having a plurality of receptacles;

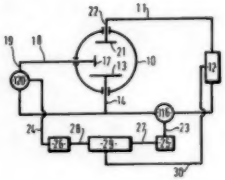
means for moving said table along said second horizontal axis to place any selected one of said plurality of receptacles in a tray mounted on said table at either of said work stations in registry with said pipette assembly; and

means for controlling each of said moving means for said head assembly, pipette assembly, plunger and table to effect transfer of a liquid sample between at least one receptacle in said tray mounted at one of said stations to at least one receptacle located at the other of said work stations.

B1 4,587,458 (801st)
CONTROLLING CURRENT DENSITY

John Davenport, Cambridge, England, and Michael A. Russo, Trevose, Pa., assignors to TI (Group Services) Limited, Birmingham, England

Reexamination Request No. 90/001,259, Jun. 5, 1987.
Reexamination Certificate for Patent No. 4,587,458, issued May 6, 1986, Ser. No. 629,812, Jul. 11, 1984.
Claims priority, application United Kingdom, Feb. 17, 1984, 8404173
Int. Cl.[4] G01N *23/00;* **H01J** *7/24*
U.S. Cl. 315—111.01



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–9** is confirmed.

1. Current density controlling apparatus, for controlling the density of an electric current at the surface of a workpiece during gaseous ionic surface treatment of the workpiece, including a chamber in which the workpiece is located and connected as one electrode of one polarity, a second electrode operative within the chamber and connected at the opposite polarity, gas supply means to provide a gaseous atmosphere within the chamber of required composition, temperature and pressure, wherein the improvement comprises a third electrode of known area within the chamber connected to be at the same polarity and potential as the workpiece, and located adjacent the workpiece and current measuring means connected to measure the current passing through the third electrode and thereby to provide one of a measurement and control of the common current density at the surface of the third electrode and of the workpiece.

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,565

FOUR-WHEEL VEHICLE DRIVE SYSTEM

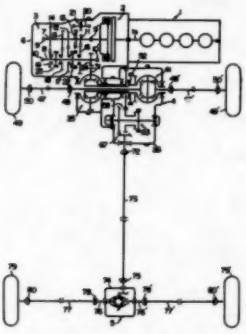
Kazuyoshi Hiraiwa, Atsugi, Japan, assignor to Nissan Motor Company, Limited, Japan

Original No. 4,476,953, dated Oct. 16, 1984, Ser. No. 411,814, Aug. 26, 1982. Application for reissue Apr. 10, 1986, Ser. No. 850,151

Claims priority, application Japan, Oct. 12, 1981, 56-162355

Int. Cl.[4] B60K *5/04, 17/34*

U.S. Cl. 180—249 **10 Claims**



1. A four-wheel drive system for a vehicle with first and second pairs of road wheels, comprising

a power unit having an output shaft rotatable about an axis in a lateral direction of the vehicle;

a power transmission gear unit including transmission input and output shafts each having an axis of rotation in a lateral direction of the vehicle;

a final reduction gear rotatable about an axis parallel with the respective axes of rotation of the transmission input and output shafts, the transmission output shaft being held in driving engagement with said final reduction gear;

a main transaxle gear casing having enclosed therein said transmission gear unit and said final reduction gear;

an auxiliary transaxle gear casing secured to said main transaxle gear casing;

a central differential gear assembly enclosed within said main transaxle gear casing and including a differential gear [housing] *member* coaxially rotatable with said final reduction gear about the axis of rotation of the final reduction gear and two output members enclosed within said differential gear [housing] *member* and rotatable at different speeds about axes substantially aligned with the axis of rotation of the differential gear [housing] *member;*

a first wheel drive gear unit enclosed within said auxiliary transaxle gear casing and comprising a differential gear assembly operatively connected to the first pair of road wheels of the vehicle and including an input member rotatable with one of the two output members of the central differential gear assembly about an axis in a lateral direction of the vehicle;

intermediate gear means enclosed within said auxiliary transaxle gear casing and including an input gear rotatable with the other of the two output members of the central differential gear assembly about an axis substantially aligned with the axis of rotation of the output member of the central differential gear assembly;

a second wheel drive gear unit comprising a differential gear assembly operatively connected to the second pair of road wheels of the vehicle; and

right-angle power transfer gear means enclosed within said auxiliary transaxle casing and operative to transmit driving power from said intermediate gear means to the differential gear assembly of the second wheel drive gear unit in a fore-and-aft direction of the vehicle.

PLANT PATENTS

GRANTED DECEMBER 22, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,063

VARIETY OF GERANIUM NAMED CLARET

Blair L. Winner, Lompoc, Calif., assignor to Denholm Seeds, Lompoc, Calif.

Filed Nov. 22, 1985, Ser. No. 800,807
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of geranium plant substantially as herein shown and described and parts therefor.

6,064

VARIETY OF GERANIUM NAMED VICTORIA

Blair L. Winner, Lompoc, Calif., assignor to Denholm Seeds, Lompoc, Calif.

Filed Nov. 22, 1985, Ser. No. 800,974
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of geranium plant substantially as herein shown and described and parts therefor.

6,065

VARIETY OF GERANIUM NAMED VALERIE

Blair L. Winner, Lompoc, Calif., assignor to Denholm Seeds, Lompoc, Calif.

Filed Nov. 22, 1985, Ser. No. 800,808
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of geranium plant substantially as herein shown and described and parts therefor.

6,066

VARIETY OF GERANIUM NAMED DIPLOMAT

Blair L. Winner, Lompoc, Calif., assignor to Denholm Seeds, Lompoc, Calif.

Filed Nov. 29, 1985, Ser. No. 802,981
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of geranium plant substantially as herein shown and described and parts therefor.

6,067

CHRYSANTHEMUM NAMED "RESIDENT"

Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association NV, Netherlands Antilles

Filed Sep. 30, 1985, Ser. No. 781,994
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinctive variety of Chrysanthemum as described and illustrated in the foregoing specification and accompanying drawings.

PATENTS

GRANTED DEC. 22, 1987

ERRATA

For CLASS	See PATENT NO.
180-020	4,714,140
439-395	4,714,306
437-002	4,714,510
437-081	4,714,519
437-228	4,714,520
427-039	4,714,589
514-303	4,714,762
329-050	4,714,892

PATENTS

GRANTED DECEMBER 22, 1987

GENERAL AND MECHANICAL

4,713,842
PROTECTIVE MULTIPLE FEEDING MEANS GARMENT
Jerusha A. Patterson, 5902 31st Ave., #512, Hyattsville, Md. 20782
Filed Oct. 1, 1986, Ser. No. 913,974
Int. Cl.[4] A41D *1/20*
U.S. Cl. 2—104 **4 Claims**

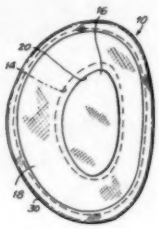
1. A protective single-piece garment for a wearer, which allows a baby to be breast fed or bottle fed comprising: garment means that cover the chest area of the wearer; a series of receiving and securing elastic bottle holding loops arranged in inverted arcuate form and affixed to the front upper part of said garment above the breast area of the wearer to hold a bottle in the feeding position without support of the wearer's hand during feeding; and snap-away panel means secured in a fastened position on the breast area under said series of receiving and securing elastic means.

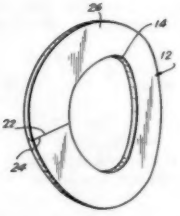
4,713,843
SELF-SUPPORTING EAR PROTECTOR
Karen Duncan, 15 Palmer St., Cos Cob, Conn. 06870
Continuation-in-part of Ser. No. 885,475, Jul. 14, 1986, abandoned. This application Feb. 2, 1987, Ser. No. 9,726
Int. Cl.[4] A42B *1/06*
U.S. Cl. 2—209 **9 Claims**

1. An ear protector comprising:

a flexible member including a flat, elongated sheet of a resilient, flexible plastic material substantially impervious to cold weather conditions and having opposite edges, said opposite edges abutting each other in a non-overlapping relation and sealed to each other to form said sheet into a continuous loop of substantially constant thickness having a general configuration of an ear to be protected, said continuous loop defining a first central opening therein;

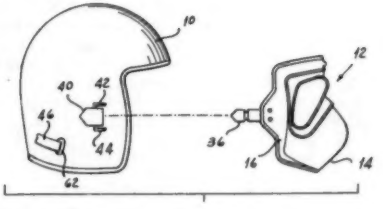
an outer protective exposed layer of material secured to one side of said sheet of plastic material in covering relation to said first central opening; and





an inner layer secured to an opposite side of said sheet of plastic material and having a second central opening in substantial alignment with said first central opening.

4,713,844
PROTECTIVE HELMET WITH FACE MASK SEALING MEANS
Charles A. Westgate, Carbondale, Pa., assignor to Gentex Corporation, Carbondale, Pa.
Filed Jul. 16, 1986, Ser. No. 886,261
Int. Cl.[4] A42B *3/02*
U.S. Cl. 2—411 **12 Claims**



1. A helmet and face mask assembly including in combination, a helmet adapted to fit over the wearer's head, a face mask having a seal adapted to engage the wearer's face, interengageable means on said helmet and said face mask for securing said mask in position on said helmet in front of the wearer's face, means within said helmet adapted to be actuated to move the wearer's head forward relative to said helmet without changing the position of said mask on said helmet, and externally accessible means on said helmet operable to actuate said head-moving means to bring the wearer's face into engagement with said seal after said face mask has been attached to said helmet.

4,713,845

TOILET SEAT DISENFECTING DEVICE

Salvatore A. Bono, 885 Manor La., Bayshore, N.Y. 11706

Filed Nov. 17, 1986, Ser. No. 931,554
Int. Cl.[4] A47K *13/00*
U.S. Cl. 4—233 **6 Claims**

1. A disinfecting device for a toilet seat having a hinged cover with the toilet seat being hinge mounted to a toilet bowl, said device comprising:

(a) a toilet seat cover

(b) a receptacle being of a size to cover rim width of the toilet seat;

(c) means for mounting said receptacle to underside of the cover so as to slidably travel around perimeter of the cover when said receptacle is manually manipulated, the cover having a track extending around the perimter of the underside thereof, said mounting means including a follower extending upwardly from center of said receptacle to engage with said track, said track having a tongue member extending inwardly from one side thereof, said follower having a ball member at remote end thereof, said ball member having a groove extending inwardly so as to receive said tongue member in said track to properly position said receptacle and prevent removal of said receptacle from underside of the cover; and

(d) means for disenfecting the toilet seat, said means mounted with said receptacle and extends outwardly therefrom so as to make contact with the toilet seat when the cover is in a closed position over the toilet seat, said disenfecting means including a casing being of a size to removably fit within said receptacle, said casing having a hollow chamber and a pair of slots, each said slot at opposite ends of said casing, said disinfecting means further including a pair of reels each of which is positioned within said hollow chamber at said opposite ends of said casing and rotatably mounted to side walls thereof, a rubber pad mounted to underside of said casing, and an elongated disinfectant sheet stored on first of said reels at forward end of said casing, extending outwardly from said first slot around said rubber pad, into second slot and onto second of said reels at rearward end, to act as a wind up reel.

4,713,846

FOOT REST FOR TOILET

Frank S. Hodroski, Jr., R.D. 5, Box 24 A, Jackson, N.J. 08527

Filed Jun. 10, 1986, Ser. No. 872,669
Int. Cl.[4] E03D *11/00*
U.S. Cl. 4—254 **5 Claims**

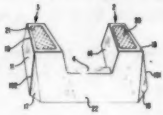
1. A foot rest for use with a toilet, said toilet comprising a bowl and a base on which said bowl rests, said foot rest comprising:

an inverted trough comprising:

a top surface having two extremities and a middle; and

two side walls connected to said top surface,

said trough having a generally U-shaped cross-section, said trough further being hollow and shaped to define a generally U-shaped opening for receiving said base, said opening being sufficiently large so that said foot rest may be moved relative to said base when said opening so receives said base, and so that said foot rest may be so moved to a position substantially completely underneath said toilet,



said foot rest being composed of a light-weight material;

said foot rest being slidably adjustable during use of said toilet.

4,713,847

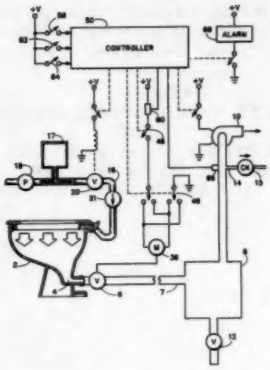
VACUUM TOILET SYSTEM

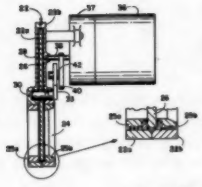
Sven Oldfelt, Vaxholm, and Sigvard Söderström, Hägersten, both of Sweden, assignors to Oy Wärtsilä Ab, Helsinki, Finland

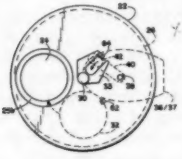
Filed Feb. 2, 1987, Ser. No. 9,709
Int. Cl.[4] B64D *11/02;* **E03D** *11/00*
U.S. Cl. 4—316 **14 Claims**

1. A vacuum toilet system comprising a waste-receiving bowl defining an interior space for receiving waste material and having an outlet, a sewer pipe defining an interior space that can be placed at a pressure that is lower than that in the interior space of the waste-receiving bowl, and a discharge valve connected between the sewer pipe and the outlet of the waste-receiving bowl for controlling passage of material between the waste-receiving bowl and the sewer pipe, said discharge valve comprising valve portions that are movable selectively relative to one another between an open position in which the valve is open and a closed position in which the valve is closed, and a drive mechanism that acts on at least one of said valve portions for bringing about relative movement of said valve portions, and the system further comprising sensor means for sensing whether the drive mechanism is able to bring the valve portions to the closed position and providing a control signal in the event that the drive mechanism is unable to cause the valve portions to attain the closed position, a control device which is connected to the drive mechanism and responds to a user stimulus when the valve portions are in the closed position by causing the drive mechanism to bring the valve portions to the open position and subsequently causing the drive mechanism to bring the valve portions towards the

closed position, the control device responding to said control signal by causing the drive mechanism to bring the valve







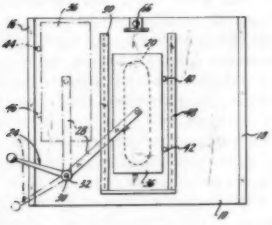
portions towards the open position and subsequently towards the closed position.

4,713,848

HYGIENIC WHEELCHAIR SEAT FOR EXTENDED USE

Jean R. Domovs, 22 Dayton Rd., Morris Plains, N.J. 07950, and Willard H. Rice, Meridith, N.H., assignors to Jean R. Domovs, Morris Plains, N.J.

Filed Jul. 16, 1986, Ser. No. 886,359
Int. Cl.[4] A47K *11/06*
U.S. Cl. 4—480 **8 Claims**



1. A wheelchair seat for placement in a foldable wheelchair frame comprising

(i) a rigid, substantially flat seat base operable to be received by a wheelchair frame and to support a person thereon in a seated position, said seat base having

an elongated aperture defined in said seat base which aperture is coaxial with the major axis of the perineum of a person when normally seated on said seat base, said aperture being of such minimal dimensions as to permit the normally free passage of urinary and fecal excretions through said aperture without detracting from the support provided by said seat base;

(ii) an elongated arm member pivotably mounted on the underside of said seat base for rotation about an axis perpendicular to the major plane of said seat base, a portion of said arm member passing under said aperture;

(iii) an elongated gate of a length and a width sufficient to occlude said aperture, said gate being rotatably mounted at a point on said arm member passing under said aperture;

(iv) first stop means disposed on the bottom of said seat base and operable upon rotation of said arm member in a first direction to engage said gate at a first aperture-occluding position;

(v) second stop means disposed on the bottom of said seat base and operable upon rotation of said arm member in a second, opposite, direction to engage said gate at a second, non-occluding, position; and

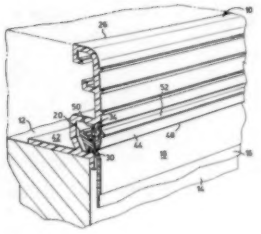
(vi) support means disposed on said seat base beneath said aperture and said gate and operable to support a removable waste receptacle in a position vertically aligned with said aperture.

4,713,849

POOL LINER RETAINER WITH CLOSURE CLIP

William Kindness, Toronto, Canada, assignor to Kafko Manufacturing Limited, Mississagua, Canada

Continuation of Ser. No. 777,581, Sep. 19, 1985. This application Mar. 2, 1987, Ser. No. 20,228
Int. Cl.[4] E04H *3/18*
U.S. Cl. 4—496 **14 Claims**



1. A pool liner retainer comprising;

an elongated retaining element including means defining a longitudinal holding channel for accommodating a pool liner bead, said holding channel having an upper wall, a rear wall, a bottom wall having an upwardly extending first flange, and a front wall defined by a downwardly extending second flange, said second flange extending from said top wall toward said bottom wall, the area between the bottom of said second flange and the top of said first flange forming a slot for insertion of the linear bead into said holding channel; and

an elongated resilient clip means for insertion over said second flange from the bottom of said second flange and for entrapping the linear bead within said holding channel, said clip means including means defining a longitudinal cavity therein for receiving said second flange when said clip means is inserted over said second flange and for retaining said clip means on said second flange by tight fitting engagement with said second flange,

whereby when said clip means is assembled on said second flange, forces acting on said pool liner will cause said liner bead to hook on said first flange and press said clip means into tighter engagement with said second flange thereby

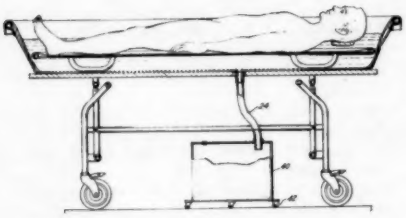
to prevent separation of said liner bead from said holding channel.

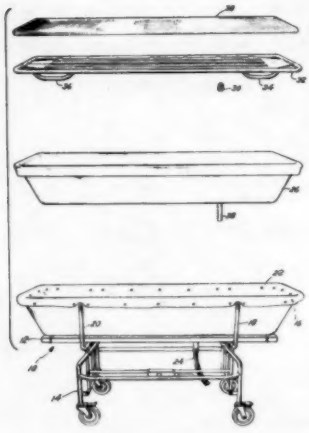
4,713,850

PATIENT IMMERSION VESSEL AND SYSTEM

Patrick Flaherty, Peoria, and Jon D. Bridgwater, Morton, both of Ill., assignors to Morton Metalcraft Company, Morton, Ill.

Filed Feb. 5, 1987, Ser. No. 11,319
Int. Cl.[4] A47K *3/06*
U.S. Cl. 4—585 **14 Claims**





1. An improved portable bathing apparatus especially useful for washing of toxic substances from a human in a prone position, said apparatus comprising, in combination:

a support platform mounted on a support frame to define a generally horizontal table;

a circumferential rail for the table, with means attached to the rail for raising and lowering the rail between a position generally coplanar with the table and a position above the plane of the table;

a flexible, fluid impermeable sheet supported by the rail and defining a fluid vessel when the rail is raised, said vessel having a bottom supported by the table when the rail is in the raised position;

a flexible, fluid impermeable, detachable liner detachably supported by the rail on the inside of the vessel defined by the sheet;

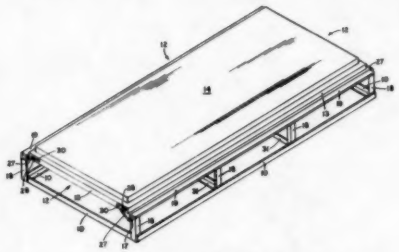
a stainless steel stretcher supported on the platform inside the vessel, said stretcher supported by at least four elevating supports integral with the stretcher and depending from the stretcher, said stretcher including a horizontal stainless steel stretcher bed, said bed including a plurality of slots along the length of the bed, said stretcher also including a circumferential stainless steel tube surrounding the bed and attached thereto, said supports depending from the tube, whereby a patient may be supported on the stretcher in the vessel for immersion or washing therein.

4,713,851

BED OR BUNK TORSION SPRING SUSPENSION SYSTEM

Von D. Rosquist, P.O. Box 161, LeVan, Utah 84639

Filed Jul. 2, 1985, Ser. No. 737,395
Int. Cl.[4] A47C *19/16;* **B63B** *29/10;* **B60J** *1/00;* **F16F** *3/00*
U.S. Cl. 5—118 **6 Claims**



1. A suspension system for a bed or bunk which is adapted to maintain a mattress supported thereon in a substantially horizontal orientation, said suspension system comprising:

a lower support frame which is adapted to lie in a substantially horizontal position;

an upper mattress support frame having a substantially rigid skeletal structure comprising opposed, substantially parallel sides and opposite ends interconnected between said opposed sides, said upper frame being adapted to be positioned above the lower support frame;

at least two elongated torsion spring members each including first and second ends and a torsion element connecting said first end to said second end;

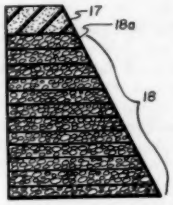
means for mounting at least one of said torsion springs adjacent each of said sides and intermediate said upper support frame and said lower support frame such that said upper mattress support frame is supported above said lower support frame by said torsion springs, said mounting means comprising attachments for securing said first end of said torsion springs firmly to the corresponding sides of said lower frame such that each of said first ends is restrained from rotational movement about the longitudinal axis thereof, said mounting means further comprising connecting means which operably connect said second ends of said torsion spring members to the corresponding ends of said upper frame, with said connecting means being integrally attached to said mutually respective second ends of said torsion spring members and said second ends extending from said torsion elements of said torsion spring members at an angle from the longitudinal axis of said torsion spring members, said mounting means additionally comprising a lost motion means operably associated with said upper support frame for permitting substantially only vertical displacement of said upper support frame under the influence of the spring action of the torsion spring members whereby the torsion spring members dampen the vertical displacement between said upper support frame and said lower support frame, said lost motion means being formed in said ends of said upper support frame; and

said torsion element of said torsion springs extending generally parallel to the corresponding sides of said upper support frame and removed from the outer periphery of said upper support frame.

4,713,852
HYBRID WATER BED MATTRESS

Moroni Fox, Sr., 2760 Claybourne Cir., Salt Lake City, Utah 84109, and Dana G. Fox, 4467 Nancy Dr., Salt Lake City, Utah 84120

Filed Mar. 24, 1986, Ser. No. 842,817
Int. Cl.[4] A47C *27/08*
U.S. Cl. 5—451 **9 Claims**



1. A hybrid water bed mattress having dimensions substantially similar to those of a conventional innerspring mattress comprising:

a water-filled bladder; and

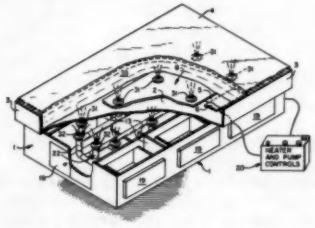
a peripheral restraining member for providing lateral support for said bladder when it is filled with water, said restraining member comprising:

an encircling sidewall having an overall height substantially equivalent to the height of said bladder when filled with water and a width sufficient to resist, without substantial deflection of said sidewall, the lateral force applied to said sidewall by a water-filled baldder, said sidewall containing as at least a significant part of its lateral support structure a tough, resilient, substantially rigid polyethylene foam having a density of about 1.2 lbs. per cubic foot to about 2.0 lbs. per cubic foot, said polyethylene foam having at least two internal laminations of polyethylene foam slabs of substantially identical physical and chemical properties bonded together, the bonds between said slabs being substantially planar and substantially parallel to the lateral force applied to said sidewall by a water-filled bladder, said polyethylene foam having a significant resistance to take a deformation set upon exposure to significant loads over an extended period of time.

4,713,853
APPARATUS FOR IMPROVED WATER THERAPY

Dominic A. Ricchio, 6021 56th Ave., Kenosha, Wis. 53142

Division of Ser. No. 447,763, Dec. 8, 1982, which is a continuation-in-part of Ser. No. 371,456, Apr. 23, 1982. This application Aug. 19, 1986, Ser. No. 898,149
Int. Cl.[4] A47C *27/08*
U.S. Cl. 5—451 **11 Claims**



1. A waterbed for circulating streams of pressurized, heated water to massage a reclining person supported thereon, the waterbed comprising:

an enclosure having a top membrane of water-impervious material for supporting the reclining person in a floating manner on a volume of water that extends at least the length and width of the person;

a volume of water within said enclosure;

base means for supporting the enclosure in an elevated position;

a retainer of water-impervious material positioned between the base means and the enclosure;

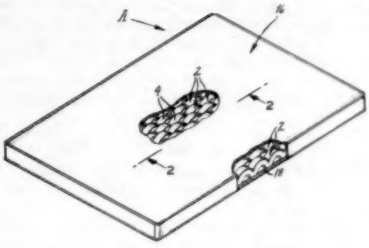
an array of water inlets and at least one water outlet sealingly clamped to the retainer for support of the water inlets and water outlet in an elevated position by the base means, the water inlets opening into the interior of the enclosure and being aimed for directing streams of pressurized heated water upwardly towards the top membrane and the water outlet opening into the interior of the enclosure and being operable for conveying heated water out of the enclosure;

a water pump in fluid communication with the water outlet to draw the water from the enclosure and in fluid communication with the water inlets to provide recirculation, the water pump imparting sufficient pressure to the streams of pressurized heated water to drive the streams through the water in the enclosure to impinge on the top membrane.

4,713,854
CONSTANT FORCE CUSHION

Robert H. Graebe, 4 Signal Hill Blvd., Belleville, Ill. 62223

Continuation-in-part of Ser. No. 451,445, Dec. 20, 1982, abandoned. This application Mar. 29, 1985, Ser. No. 717,329
Int. Cl.[4] A47C *27/16*
U.S. Cl. 5—481 **20 Claims**



1. A cushion comprising: arch-like segments formed from a resilient material and arranged in a plurality of side-by-side rows such that each row possesses a generally undulated configurastion, each arch-like segment having a curved convex surface and a curved concave surface, as well as generally flat side surfaces between the curved convex and concave surfaces, the arch-like segments of the rows being arranged such that the curved convex surfaces are presented in one direction and the curved concave surface are presented in the opposite direction and further such that side faces of the arch-like segments in adjacent rows face each other and are located in close proximity to each other, the arch-like segments of any one row being offset with respect to the arch-like segments of a row adjacent to that one row so that curved surfaces of the arch-like segments in the two rows do not align.

19. A cushion comprising a plurality of strips which are located side-by-side and are formed from a resilient foam material, each strip having a front face which is presented toward the user of the cushion and a back face which is presented away from the user of the cushion and generally flat side faces extended between the front and back faces, the front and back faces of the strips being configured to provide a succession of arches along each strip with the arches being oriented to impart a generally undulated shape to each strip, the strips being positioned with the side faces of any one strip being close to and facing the side faces of the strips adjacent to that strip, and with such facing side faces being substantially detached from

each other so that the strip does not significantly impede flexure of the strips adjacent to it and vice-versa, the strips also being positioned such that the arches on any one strip are offset with respect to the arches of the strips adjacent to that one strip, so that the arches of adjacent strips do not align across the cushion.

4,713,855

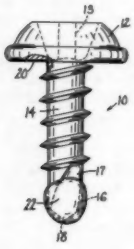
PROCESS FOR MAKING SELF-DRILLING FASTENERS

Jacob Hyner, Waterbury, and Steven Gradowski, Torrington, both of Conn., assignors to Whyco Chromium Company, Inc., Thomaston, Conn.

Division of Ser. No. 808,514, Dec. 13, 1985, Pat. No. 4,692,080. This application May 4, 1987, Ser. No. 46,237

Int. Cl.[4] B23G *9/00*

U.S. Cl. 10—10 R **12 Claims**



1. A process for making a screw fastener having a head, a shank and a tip area configured as a drill point comprising, applying a quick curing resin coating over the tip area of said fastener while leaving the remaining head and shank portion uncoated, curing said resin coating to form a frangible layer on said tip area and electroplating a corrosion resistant metal onto the uncoated remaining head and shank portion of the screw.

4,713,856

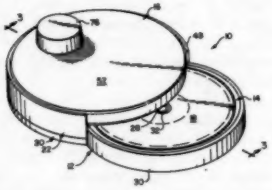
APPARATUS FOR CLEANING DIGITAL AUDIO DISCS

Eivind Clausen, Bellingham, Wash., assignor to Allsop, Inc., Bellingham, Wash.

Continuation of Ser. No. 600,495, Apr. 16, 1984, Pat. No. 4,556,433. This application Nov. 4, 1985, Ser. No. 794,665

Int. Cl.[4] B08B *11/02*; G11B *3/58*

U.S. Cl. 15—97 R **17 Claims**



1. An apparatus adapted to clean an object, such as a digitally encoded disc, in a cleaning pattern with a wiping path having a path component extending between a peripheral portion and a middle portion of said object, said apparatus comprising:

a. a base structure;

b. a support member having a support contact surface to support an object to be cleaned at a support location in a general support plane to expose a surface of the object to be cleaned at a contact location having a contact plane, said contact location having a middle support axis having a substantial alignment component generally perpendicular to said contact plane;

c. a cleaning member having a cleaning surface and being mounted to said base structure so as to be positioned with the cleaning surface positioned at the contact plane, said cleaning member having a cleaning axis having a substantial alignment component parallel to said support axis and spaced laterally therefrom;

d. said support member and said cleaning member being mounted for a first path of rotation relative to one another in a manner that the cleaning member rotates about its cleaning axis relative to said support member to cause relative cleaning motion of the cleaning member in a path moving across the contact plane toward and away from said support axis, said support member and said cleaning member also being mounted for a second path of relative rotation of the support contact surface about the support axis relative to the cleaning axis;

e. drive transmitting means operatively connected between the support member and the cleaning member in a manner that relative rotation of one of said support member and cleaning member effects relative rotation of the other of said support member and cleaning member;

f. said support member being rotatably mounted about said support axis which remains stationary relative to said base structure, and said cleaning member being mounted for rotation about said cleaning axis which remains stationary relative to said base structure during operation of said apparatus; and

g. said drive transmitting means comprising a gear transmission, which further comprises at least a first gear mounted to said cleaning member and a second gear mounted to said support member, with said first and second gear members engaging one another directly;

whereby, as said cleaning member is rotated relative to the support member about the cleaning axis, there is relative rotation of the support member to shift the path of the cleaning motion of the cleaning member relative to the support surface.

4,713,857

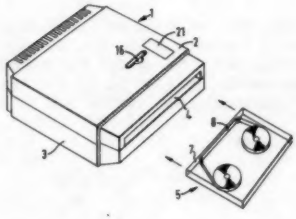
APPARATUS FOR USE IN CLEANING THE TAPE OF A TAPE CASSETTE

Don R. Cecil, Gwent, Great Britain, and Richard P. Evans, Wavre, Belgium, assignors to Pacefault Limited, Gwent, England

Filed Dec. 4, 1986, Ser. No. 937,826

Int. Cl.[4] B08B *11/02*

U.S. Cl. 15—97 R **12 Claims**



1. Apparatus for use in cleaning the tape of a tape cassette, the apparatus comprising:

(a) a housing;

(b) an aperture defined by the housing whereby a tape cassette can be inserted into the housing;

(c) an opening defined by the housing through which a tape cleaning device can be inserted into the housing;

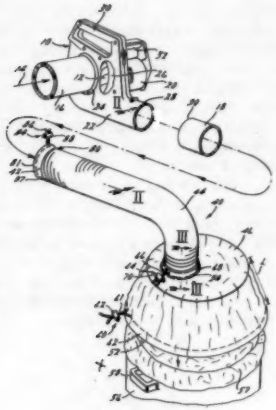
(d) drive means in the housing for causing the tape of a tape cassette inserted into the housing to be driven past the cleaning device in contact therewith to be cleaned; and

(e) electronic logic control circuitry in the housing for controlling the drive means in response to insertion of a cleaning device and a tape cassette.

4,713,858
LEAF COLLECTION APPARATUS FOR BLOWER-VACUUMS

John D. Kelber, 1093 Suffield, Birmingham, Mich. 48009

Filed Apr. 14, 1986, Ser. No. 852,720
Int. Cl.[4] A47L 5/32
U.S. Cl. 15—347 4 Claims



1. A leaf collection apparatus for attachment to a hand held portable vacuum device, said vacuum device including a vacuum inlet and an air outlet, said inlet for drawing leaves into said vacuum device and said outlet for ejecting leaves from said vacuum device into and through said leaf collection apparatus to deposit the leaves into a suitable container, said leaf collection apparatus comprising:

an elongated flexible hose having a sleeve end and a discharge end;

sleeve means operable for attachment between said outlet of the vacuum device and said sleeve end of said hose, said sleeve means attaching the sleeve end of the hose to the vacuum device and protecting the hose from being punctured by leaves entering said hose from said outlet;

shroud means having a hose connecting end and a container end;

first and second adjustable connection means integral with said hose connecting end and said container end respectively for allowing releasably adaptable connection of said shroud means between varying sizes of hoses and varying sizes of containers;

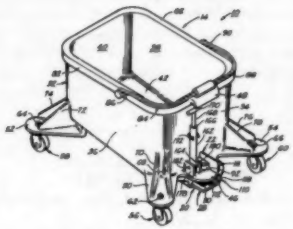
third adjustable connection means at said sleeve end of said hose for allowing releasably adaptable connection to accommodate varying sizes of air outlets for allowing releasable adaptable connection to varying sizes of outlets of the vacuum device;

said shroud means sealingly attached to said discharge end of said hose at said hose connecting end and sealingly attached to a suitable container at said container end by said first and second adjustable connection means respectively, said shroud means acting as an intermediary adapting member between said hose and the container for allowing deposit of leaves from said hose into the container, whereby said leaf apparatus is adaptable to deposit leaves in a variety of sizes of containers and is adaptable for connection to a variety of sizes of outlets of hand held portable vacuum devices.

4,713,859
PORTABLE CLEANING CONTAINER

Don A. Smith, Jr., 811 Mockingbird La., Norman, Okla. 73071

Filed Sep. 5, 1986, Ser. No. 904,164
Int. Cl.[4] A47L 13/50
U.S. Cl. 15—264 22 Claims



1. An improved portable cleaning station comprising:

bucket means for containing a cleaning solution, the bucket means having a drain opening at its lowermost portion;

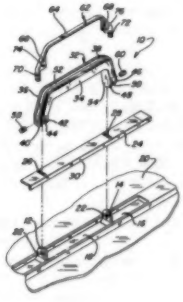
valve means supported by the bucket means and communicating with the drain opening for selectively opening and closing the drain opening, the valve means having a drain spigot having a drain bore therein, the drain bore openly communicating with the drain opening of the bucket means when the valve means is in an open position such that cleaning solution in the bucket means is discharged from the bucket means in a substantially downward path via the drain opening and the drain bore, the drain spigot forming a substantially fluid-tight seal with the drain opening when the valve means is in a closed position such that cleaning solution is retained in the bucket means; and

filter means supported by the underside of the bucket means for removing insoluble debris from the cleaning solution discharged through the drain opening and the drain bore, the filter means selectively movable between an extended position and a retracted position, in the extended position the filter means being disposed in a filtering relationship to the downward path of discharging cleaning solution, in the retracted position the filter means being disposed in a protected position beneath the bucket means.

4,713,860
HANDLE ASSEMBLY

Lawrence R. Mobley, Parker; Mark B. Nordstrom, Denver, and Roger D. Winter, Lakewood, all of Colo., assignors to Samsonite Corporation, Denver, Colo.

Filed Jan. 22, 1982, Ser. No. 341,745
Int. Cl.[4] A45C 13/00
U.S. Cl. 16—111 R 12 Claims



1. A handle assembly comprising:

handle means including a gripping handle having an inner side, an outer side and ends;

at least one exposed opening in an outer side of said gripping handle adjacent each of said ends through which coupling means are inserted;

coupling means connecting said handle means to an article; and

integral cover means joined to and substantially coextensive with said handle means and terminating adjacent said ends of said gripping handle and said cover means forming at least a portion of said outer side of said gripping handle and covering said openings and said coupling means so that said coupling means is substantially concealed from view.

4,713,861

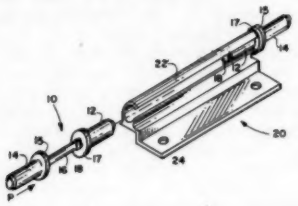
HINGE PIN

Joseph C. Bancroft, Longwood, Fla., assignor to Croft Metals, Inc., McComb, Miss.

Filed Jun. 16, 1986, Ser. No. 874,567

Int. Cl.[4] E05D *11/00*

U.S. Cl. 16—222 **2 Claims**



1. A hinge leaf assembly comprising:

(a) a hinge leaf having a barrel disposed along one edge thereof;

(b) a pair of plastic hinge pin and bearing elements each having

(i) a cylindrical bushing inserted in an end of said barrel, said bushing having a cylindrical bore therethrough;

(ii) a cylindrical hinge pin element attached concentrically to a cylindrical plug element, said plug element for insertion into a jamb hinge leaf,

(iii) a plurality of thin webs attaching an end of said hinge pin element to said bushing; and

(c) said hinge pin and bearing elements adapted to, upon cmpressive force being applied to ends of said plug elements toward said hinge leaf barrel, permit breakage of said webs, insertion of said pin elements through said bores, and seating of said plug elements and said bushings together to form bearing surfaces.

4,713,862

SIDE DOOR HINGE MECHANISM IN MOTOR VEHICLE

Eiichi Kinaga, Toyota, and Daiichi Shiraishi, Seto, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Oct. 31, 1985, Ser. No. 793,246

Claims priority, application Japan, Nov. 2, 1984, 59-231679; Nov. 2, 1984, 59-167005[U]; Nov. 2, 1984, 59-167006[U]; Nov. 2, 1984, 59-167009[U]; Nov. 2, 1984, 59-167011[U]

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.[4] E05D *15/32*

U.S. Cl. 16—223 **6 Claims**

1. A side door hinge mechanism in a motor vehicle having a quadric rotary link device for movably connecting a rocket proximal end of a side door to a side of a vehicle body, said hinge mechanism comprising:

a body side bare formed long in the vertical direction along a surface of a front pillar of the vehicle body,

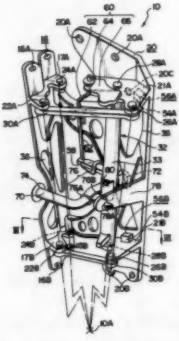
a door side base formed long in the vertical direction along a surface of the rocking proximal end of the side door of said vehicle body,

a plurality of top rotary center shafts and a corresponding plurality of bottom rotary center shafts aligned with said top rotary center shafts and positioned downwardly therefrom, said top and bottom rotary center shafts being located in pairs in top and bottom portions of said body side base and said door side base, each rotary center shaft of each pair of rotary center shafts being spaced from each other;

a first control arm connected at one end to one rotary center shaft of one pair of rotary center shafts on the body side base and at an opposite end to one rotary center shaft of one pair of rotary center shafts on the door side base; and

a second control arm connected at one end to the other rotary center shaft in said pair of rotary center shafts on said body side base and at an opposite end to the other of said rotry center shafts in said pair of rotary center shafts on the said door side base;

wherein one of said first and said second arms is a top control arm rotatably connected at opposite ends thereof to said top rotary center shafts on one side of said body base and said door side base and a bottom control arm is rotatably connected at opposite ends thereof to said bottom rotary center shafts aligned with said top rotary center shafts at the opposite ends of said top control arm; and the other of said first arm and second arm is a main arm



formed integrally in the vertical direction and rotatably connected at opposite ends thereof in the vertical and widthwise directions thereof to said top and bottom rotary center shafts; and

wherein said main arm is formed integrally in the vertical direction, rotatably connected at upper opposite ends thereof to the top rotary center shafts disposed inwardly in the widthwise direction of the vehicle body, on the sides of the vehicle body and the side door, respectively, and rotatably supported at lower opposite ends thereof by the bottom rotary center shafts disposed inwardly in the widthwise direction of the vehicle body, which are opposed to said top rotary center shafts, said top control arm is rotatably supported at opposite ends thereof by the remaining top rotary center shafts, and said bottom control arm is rotatably supported at opposite ends thereof by the remaining bottom rotary center shafts;

said hinge mechanism is provided therein with a wire harness extending from said rocking proximal end of the side door to which said door side base is secured to the surface of the vehicle body to which said body side base is secured, said harness passing by the rotary center shafts of said main arm on the side of the vehicle body between the top and bottom rotary center shafts in the vertical direction;

said main arm is formed with a pipe portion supported at top and bottom ends thereof by the top and bottom rotary

center shafts on the side of the vehicle body and a space adjacent to the intermediate portion in the vertical direction of said pipe portion for allowing the wire harness to pass therethrough; and

a harness protector made of resin is mounted to said pipe portion facing said space.

4,713,863

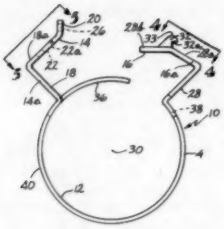
REUSEABLE CLAMP WITH AN OUTWARDLY PROJECTING EAR ON EACH OPPOSING END AND HAVING A HOOK SHAPED PROJECTION ON ONE EAR ADAPTED FOR INTERLOCKING COACTION WITH AN OPENING IN THE OTHER EAR

Ralph N. Jennings, Grafton, Ohio, assignor to Triad Metal Products Company, Cleveland, Ohio

Filed Jan. 20, 1987, Ser. No. 5,217

Int. Cl.[4] B65D *63/02*

U.S. Cl. 24—20 R **15 Claims**



1. A reuseable clamp comprising a strap of resilient material having a curved body portion and generally opposed end portions, one of said end portions having a projection extending outwardly therefrom and the other end portion including an opening formed therein through which is adapted to be received said projection, in the tightened condition of the clamp, said projection being adapted to engage the defining periphery of said opening and hold said end portions in connected condition, said projection including means facilitating the entry of said projection into said opening for holding the clamp in closed clamping condition, and for withdrawal of said projection from said opening to permit opening of said clamp, and wherein said one end portion of said strap comprises a section disposed substantially normal to the plane of the strap of said body portion and then a section which is bent generally diagonally upwardly and then a section bent to extend generally horizontally from said diagonal section, to form said one end portion of said strap, with said projection being disposed on said horizontal section, said other end portion of said strap comprising a first section which extends generally normal to the plane of said strap and then a section which is turned to extend generally at an angle of approximately 90° with respect to said first section, and then a further section which is tipped upwardly relative to said 90° section, said opening being disposed in said 90° section and being of triangular configuration in plan, with said projection being of hook-shaped configuration, said further section having a transversely extending opening therein.

4,713,864

SEPARABLE FASTENER WITH SLIDING SLEEVE

Herman A. Hess, 7601 Bathurst Street, Apt. 1403, Thornhill, Ontario, L4J 4H5, Canada

Filed Mar. 23, 1987, Ser. No. 28,798

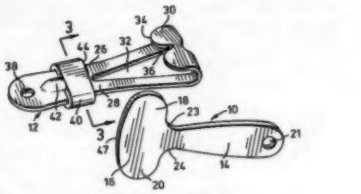
Int. Cl.[4] A44B *19/00, 11/25*

U.S. Cl. 24—590 **6 Claims**

1. A separable fastener comprising:

a male member having a stem portion and a T-shaped head portion with two arms projecting sidewards from the stem portion,

and a female member constituted by an elongated body with a tail portion and a forward portion that is bent with respect to the tail portion, the elongated body having an opening therethrough adjacent the bent forward portion, the opening being of sufficient length to permit insertion of one arm of the T-shaped head portion of the male member, said bent forward portion of the female member terminating at an edge which interferes with complete passage of the T-shaped head portion of the male member in any but one particular orientation of the male member with respect to the female member, said edge having an indentation adapted to receive the T-shaped head portion



when in said one particular orientation in order to avoid interference and permit complete passage of the T-shaped head portion through the opening, the opening further having a part wide enough to permit swivelling of the stem portion after passage of the T-shaped head portion through the opening,

the female member having a sleeve member mounted on the tail portion thereof for sliding movement along said tail portion, the sleeve member at all times embracing only said tail portion, the sleeve member being adapted to inhibit the male member from assuming said one particular orientation by partly obscuring said opening and lodging between the female member and one of the arms of the male member.

4,713,865

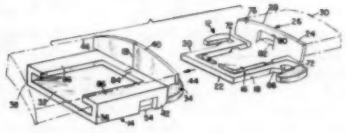
STREAMLINED UNOBSTRUSIVE JEWELRY CLASP, MEMBERS FORMING SAME AND BLANK

Simon Geldwerth, Brooklyn, N.Y., assignor to Do-All Jewelry Mfg. Co., Inc., Springfield, N.J.

Filed Jul. 8, 1986, Ser. No. 883,345

Int. Cl.[4] A44B *11/25*

U.S. Cl. 24—616 **22 Claims**



1. A clasp for connecting one end of a piece of jewelry to the other end thereof, said clasp comprising:

(a) a tongue member having a base with opposite sides, a front end on said base, and a transverse attachment portion at the rear end of the base for attachment to said one end of the piece of jewelry;

(b) a box member having a base with a front end and with opposite, upstanding side walls, and a transverse attachment portion connecting said side walls at the front end of the base for attachment to said other end of the piece of jewelry;

(c) the attachment portion of said box member forming a

transverse opening wide enough to receive the front end of the base of said tongue member;

(d) said tongue and box members being constructed and arranged such that said opposite sides of said tongue member slideably engage said upstanding side walls of said box member when the front end of said tongue member is inserted into said opening;

(e) a pair of resilient detents on said tongue member integral with and defining the sides of the base thereof, said detents being spaced from the remainder of the base of said tongue member along the length of the base adjacent the edges thereof by slits to form a pair of resilient arms that are cantilevered to the base adjacent the front end thereof; and

(f) a pair of detent receptors in said upstanding walls in said box member for receiving said detents and releasably preventing separation of the members when the latter are mated by inserting the front end of said tongue member into said opening until the attachment portion on said tongue member is adjacent to the attachment portion on said box member.

4,713,866

APPARATUS FOR ATTACHING CABLES TO MESSENGER WIRES

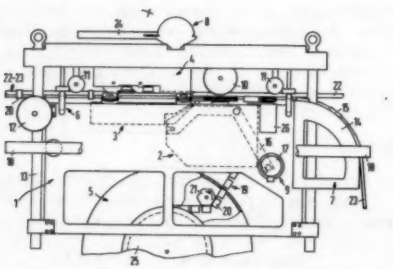
Horst Goldmann, Gilching; Guenter Einsle, Munich; Rudolf Brugger, Puchheim, and Josef Wacker, Hoehenrain, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 30, 1986, Ser. No. 824,097

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504959

Int. Cl.[4] H02G *7/05*

U.S. Cl. 29—33 K **11 Claims**



1. In an apparatus for securing a cable to a messenger wire by applying fastening elements at spaced intervals as the apparatus moves along the messenger wire, said apparatus having a frame with means for supporting the frame on the messenger wire for movement thereon, supply means mounted in the frame to provide fastening elements in a form of a tape of interconnected fastening elements, feed means for applying the elements to a combination of the messenger wire and cable including means for separating the fastening element from the end of the tape and folding means including pairs of pressure rollers for shaping the ends of the fastening elements into a folded connection, the improvements comprising the feed means being mounted in the frame beneath the cable and messenger wire, the means for separating including shearing means having a plurality of chisels and a mating roller having an abutment surface coacting with the chisels, the feed means including a lifting means for lifting served fastening elements into a position engaging the combination of the cable and messenger wire, said apparatus including drive means for actuating the feed means, said drive means having two belts which are positioned to engage the messenger wire on opposite sides as the apparatus moves along the wire, said feed means being releasably connected to the drive means to enable moving the apparatus without actuating the feed means, said two belts of the drive means engaging the free ends of the fastening element to move them toward each other and into engagement with opposite sides of the cable and messenger wire as the element moves from the feed means towards the folding means, said folding means being positioned above the messenger wire and having a wedge-shaped throat for receiving and moving the free ends of the elements close together to be engaged by the pairs of pressure rollers to form the folded connection.

4,713,867

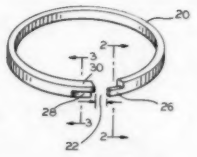
PISTON RINGS WITH A GAP SEAL

Duke Fox, 5305 Towson, Fort Smith, Ak. 72901

Filed Apr. 15, 1985, Ser. No. 723,097

Int. Cl.[4] B23P *15/06*

U.S. Cl. 29—156.6 **15 Claims**



1. A process for making a piston ring, said process comprising the steps of:

forming a circular ring;

forming a cut on the top edge and on the inside diameter cylindrical wall of the ring;

transversely slotting the ring at an end of the cut, thereby forming a gap with an associated elongated member;

forming a longitudinal slot along an edge of said ring adjacent said transverse slot, said elongated member nesting in said longitudinal slot when said ring is compressed to close said gap;

securing the ends of a flexible member extending across the slot exclusively on the outside diameter wall of said ring to hold said gap closed with said ring in said compressed state, said ring being otherwise unrestrained;

placing a plurality of said rings secured by said flexible member onto a mandrel and securely clamping said rings in abutment, whereby cumulative outside surfaces of said rings form an outside cylindrical wall; and

grinding said cumulative surfaces to form said secured and compressed rings into a substantially perfect circle, thereby completely removing entirely all of both said flexible member and the securing which attached said flexible member on said outside diameter wall of said ring.

4,713,868

INSTALLATION TOOL

Stanley E. Grabowski, Harrison, N.J., assignor to Richard Drzyzga, Edison and Michael Drzyzga, Jr., Clifton, both of, N.J., part interest to each

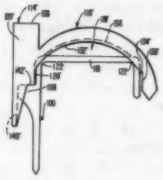
Filed May 12, 1986, Ser. No. 862,032

Int. Cl.[4] B25B *27/14*

U.S. Cl. 29—275 **20 Claims**

1. An installation tool for driving hooks having a rectangular or circular-shaped head and a shoulder extending therefrom for receiving striking forces, said tool comprising a body having an open mouth portion constructed to receive the rectangular and circular-shaped head of said hooks, said open mouth portion including a first profiled portion for receiving a portion of said rectangular-shaped head and a second profiled portion

for receiving a portion of said circular-shaped head, said first profiled portion being different from said second profiled



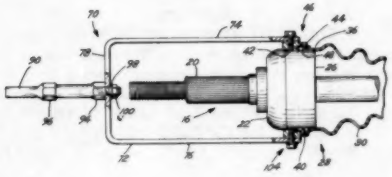
portion, and force applying means for applying a driving force to said shoulder sufficient for driving said hooks.

4,713,869

FRONT WHEEL DRIVE BOOT REMOVAL TOOL

James L. Pool, Clarinda, Iowa, assignor to Lisle Corporation, Clarinda, Iowa

Filed May 2, 1986, Ser. No. 858,644
Int. Cl.[4] B25B 27/14
U.S. Cl. 29—275 **2 Claims**



1. A universal joint boot, removal tool comprising, in combination:

an integral U-shaped yoke having first and second, elongate, parallel, spaced extension legs and a transverse interconnecting leg, said legs formed from a single bar, each of said extension legs having a generally constant size rectangular cross section end portion with a transverse ring locking aperture, at the end thereof opposite said interconnecting leg, the apertures being substantially coaxial and transverse to the extension legs, said interconnecting leg including a centrally-located attachment aperture;

an integral driver attachment adapted to engage said attachment aperture, said driver attachment being rigidly secured to said interconnecting leg of said integral U-shaped yoke;

a removable split ring member having a generally cylindrical inside surface with an inside diameter, and a generally circumferential abutment land on the inside surface for engagement with a universal boot assembly, the outside surface of the split ring member being generally cylindrical and also including first and second pairs of flanges extending outwardly from said ring member so as to define a pair of diametrically opposed slots in the outside surface of the ring member, said slots transversely spaced by a fixed distance substantially equal to the spacing of the ends of the extension legs, each slot adapted to receive one end of said extension legs in an assembled state, each slot further including a threaded fastening aperture, each aperture centrally located within said diametrically opposed slots and aligned with said ring-locking apertures of said legs in said assembled state; and

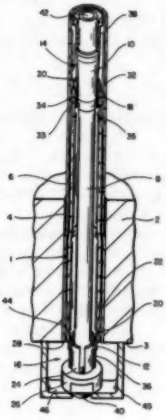
a pair of bolts rigidly, individually, and removably securing said extension legs in said split ring slots, said bolts engaging said threaded fastening apertures and extending only partially into said ring member to retain the ring member attached to the extension legs and prevent twisting of said ring member when mechanical force is applied to the tool through the driver attachment, said legs defining means for cooperation with any ring member having cooperative, parallel, extension slots spaced said fixed distance regardless of the inner surface diameter and configuration.

4,713,870

PIPE REPAIR SLEEVE APPARATUS AND METHOD OF REPAIRING A DAMAGED PIPE

Laszlo Szalvay, San Carlos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 716,265, Mar. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 596,743, Apr. 4, 1984, abandoned. This application Dec. 17, 1986, Ser. No. 943,832
Int. Cl.[4] B23P 6/00
U.S. Cl. 29—402.09 **23 Claims**



1. A method of repairing a damaged pipe, comprising the steps of:

assembling a repair apparatus assembly comprising a draw rod having an expanding means on each end thereof and a repair sleeve having two ends, the draw rod being contained within the sleeve with at least a portion of each of the expanding means protruding outside of the sleeve;

inserting the repair apparatus in the damaged pipe;

axially moving the expanding means towards one another, thereby engaging the expanding means with the ends of the sleeve;

further axially moving one expanding means toward the other expanding means while maintaining the other expanding means stationary, stopping movement of the one expanding means, then after the one expanding means stops moving, further axially moving the other expanding means toward the one expanding means while maintaining the one expanding means stationary, thereby fully expanding one end of the sleeve outwardly into engagement with the damaged pipe and then fully expanding the other end of the sleeve outwardly into engagement with the damaged pipe; and

physically removing the draw rod.

4,713,871
METHOD FOR PRODUCING AMORPHOUS ALLOY SHAPED ARTICLES

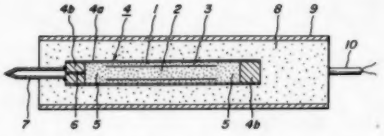
Masatada Araki, Handa; Yutaka Kuroyama; Yukihisa Takeuchi, both of Chita; Makoto Takagi, Okazaki, and Toru Imura, Nagoya, all of Japan, assignors to Nippon Oil & Fats Co., Ltd. and Nippon Denso Co., Ltd., both of, Japan

Filed Dec. 2, 1985, Ser. No. 803,238

Claims priority, application Japan, Dec. 12, 1984, 59-260844; Jul. 25, 1985, 60-162899

Int. Cl.[4] B22F *1/00*

U.S. Cl. 29—421 E **13 Claims**



1. A method for producing an amorphous alloy shaped article, comprising arranging an amorphous alloy or atomized alloy raw material powder layer adjacent to a metal powder layer in one pressing vessel to form a laminated powder layer assembly, said metal powder layer having a shock impedance nearly equal to or a little different from that of the raw material powder layer, and then applying a shock pressure to the raw material powder layer.

4,713,872
METHOD OF ATTACHING FASTENING ELEMENT TO A PANEL

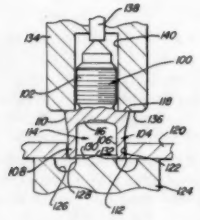
Rudolph R. M. Muller, Frankfurt, Fed. Rep. of Germany, assignor to Multifastener Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 773,387, Sep. 6, 1985, Pat. No. 4,633,560, which is a division of Ser. No. 563,833, Dec. 21, 1983, Pat. No. 4,555,838, which is a continuation-in-part of Ser. No. 458,099, Mar. 28, 1983, Pat. No. 4,459,073, and a continuation-in-part of Ser. No. 504,074, Jun. 14, 1983, Pat. No. 4,543,701 said Ser. No. 458,099 is a division of Ser. No. 229,274, abandoned, said Ser. No. 504,074 is a continuation of said Ser. No. 229,274.

This application Apr. 16, 1986, Ser. No. 852,689

Int. Cl.[4] B21D *39/00*; B23P *11/00*

U.S. Cl. 29—512 **9 Claims**



7. A method of permanently attaching a metal element to a metal panel, said panel having a predetermined substantial thickness greater than 0.1 inches and a generally circular aperture through said panel having a generally cylindrical internal surface, said element having an annular barrel portion closed at a driving end, said barrel portion including internal and external surfaces terminating in an opposite free end, said barrel portion external surface including a conical surface portion tapered outwardly from adjacent said free end to said driving end surface, and having a minor diameter generally equal to the internal diameter of said panel aperture, said method comprising the following steps performed in a generally continuos sequence.

(a) locating said element barrel portion free end adjacent said panel with said annular barrel portion generally coaxially aligned with said panel aperture and a die member located on the opposite side of said panel, said die member including a concave annular die cavity having an inner surface generally conforming to and coaxially aligned with said internal barrel portion and a panel supporting surface on at least opposed sides of said die cavity supporting said panel;

(b) driving said barrel portion free end through said panel aperture, into said die cavity, said barrel portion conical external surface plastically deforming said panel aperture cylindrical surface to generally conform to and mate with said conical barrel surface, said mating conical surfaces resisting further penetration of said barrel portion through said panel aperture; and

(c) while plastically deforming said barrel portion free end radially outwardly in said die cavity, entrapping and thickening said barrel portion and turning said barrel portion free end to engage said panel spaced from said aperture, forming an enlarged annular rim end portion on said barrel portion being hook-shaped in cross section and preventing pull-out of said element from said panel aperture.

4,713,873
WELD FIXTURE MOUNTING METHOD

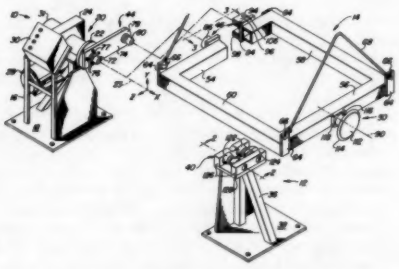
Raymond D. Gold, Waukee, and Leo W. Riegel, Ankeny, both of Iowa, assignors to Deere & Company, Moline, Ill.

Division of Ser. No. 742,243, Jun. 7, 1985, Pat. No. 4,641,820.

This application May 8, 1986, Ser. No. 860,958

Int. Cl.[4] B23Q *7/00*

U.S. Cl. 29—559 **21 Claims**



1. A method of connecting an elongated fixture to rotatable headstock and tailstock positioners for rotation about a rotational axis, the fixture having a headstock and a tailstock end, the method comprising the steps of:

(a) providing slidably engageable mounting structure on the headstock positioner and complementary mating structure on the headstock end of the fixture;

(b) providing a roller on the tailstock end of the fixture and a complementary roller assembly on the tailstock positioner;

(c) centering the headstock end of the fixture with respect to the headstock positioner, said step of centering including slidably engaging the mounting structure and mating structure; and

(d) locating the fixture both linearly and centrally with respect to both the headstock and tailstock devices, said step of locating including lowering the tailstock roller onto the roller assembly and urging the tailstock roller to a preselected axial location while causing sliding movement between the mounting structure and the mating structure, thereby accommodating axial movement of the fixture as the fixture is located linearly.

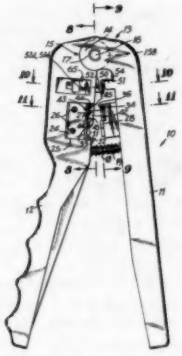
4,713,874
TELEPHONE WIRE-AND-JACK ATTACHMENT DEVICE AND KIT

Frederic W. Schwartz, Providence, R.I., assignor to Cable Electric Products, Inc., Providence, R.I.

Continuation of Ser. No. 780,760, Sep. 27, 1985, abandoned. This application Jun. 30, 1986, Ser. No. 880,463

Int. Cl.[4] H01R *43/04*

U.S. Cl. 29—566.4 **5 Claims**



1. A hand-held tool for cutting and stripping a telephone wire and attaching and electrically connecting jack connectors to said telephone wire, said hand-held tool comprising:

a first hand-held jaw member,

a second hand-held jaw member cooperating with said first hand-held jaw member and pivotably attached thereto at a top portion thereof, said jaw members cooperating with each other to define hand gripped open and closed positions,

cooperating cutting members adjacently disposed upon said first and second jaw members for cutting and stripping telephone wire, when said telephone wire is inserted between said cutting members and when said jaw members are moved from said open to said closed position,

a contoured aperture having a jack connector shape, disposed upon said first jaw member for placement of a jack connector containing said cut and stripped telephone wire, and

means disposed upon said second jaw member for attaching and electrically connecting said telephone wire to said jack connector placed in said first jaw member, when said jaw members are moved from said open to said closed position, and

said cooperating cutting members comprising;

a unitary knife blade having a straight cutting edge, mounted on said first jaw member,

a flat surface on said second jaw member for cooperating with the cutting edge of said unitary knife blade when moving from the said open to closed position, for severing a wire by cutting it through,

a pair of wall surfaces in said first jaw member, perpendicular to said knife blade, defining a recess extending below the said cutting edge, for holding the wire perpendicular to the unitary blade for effecting a square cut of the wire by the blade and flat surface, and

a knife blade, mounted on said second jaw member,

a second pair of wall surfaces in said first jaw member perpendicular to said knife blade, and a wall surface perpendicular to said second pair, defining a recess for holding the wire perpendicular to the unitary blade for effecting a square cut of the wire by the blade and flat surface,

said straight cutting edge and said second jaw member blades' cutting edges are opposed for cutting into said wire when moved from the said open to closed positon, and

a rod, mounted on a bottom portion of one of the jaw members, distal from the unitary blade and from the jack connector placement means, and a mating face on the other jaw member for establishing a controlled gap between said straight cutting edge and said second jaw member blade's cutting edge when they are moved from the said open to closed position.

4,713,875
TOOL CHANGER

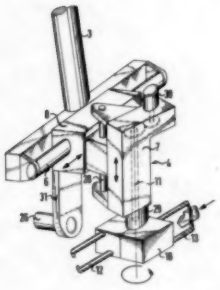
Erich Dormehl, Allendorf/Nordeck, Fed. Rep. of Germany, assignor to Heyligenstaedt & Comp. Werkzeugmaschinenfabrik GmbH, Giessen, Fed. Rep. of Germany

Filed Nov. 25, 1986, Ser. No. 936,543

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1985, 3541563

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **4 Claims**



1. Tool changer for a lathe with inclined bed with at least one tool carriage with a drumtype turret arranged on an upper bed as well as another tool carriage with a drumtype turret arranged on a lower bed, the tool changer having a ram that can move into the lathe with inclined bed and that has a double gripper head with two gripper arms arranged opposite to each other, characterized in that the tool changer **(4)** has a first guideway **(6)** arranged parallel to the plane of the machine bed **(5)** on which guideway **(6)** a tool changer head **(7)** is movable holding the double gripper head **(10)** pivotable about an axis **(11)** that is arranged rectangularly to the first guideway **(6)** and thus to the plane of the machine bed **(5)**, that the gripper arms **(12, 13)** are each arranged at the same distance to the axis **(11)** of the double gripper head **(10)** and at both sides of the axis **(11)** and that the double gripper head **(10)** is movable along its axis **(11)**.

4,713,876
MACHINE TOOL WITH GANG HEAD INTERCHANGE DEVICE

Masayoshi Takagi, Kariya; Yukio Hoshino, Gamagouri, and Hiroki Yamauchi, Kariya, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariy, Japan

Filed Mar. 16, 1987, Ser. No. 26,375

Claims priority, application Japan, Mar. 25, 1986, 61-66604

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **13 Claims**

1. A machine tool having a device for interchanging gang heads each of which holds a plurality of tools rotatably, said machine tool comprising:

a base;

a tool support mounted on the base so as to be movable in a first horizontal direction;

a tool drive means for driving the tools held by the gang heads selectively mounted on the tool support, the tool

drive means including a driving shaft mounted in the tool support;

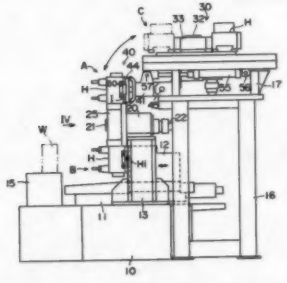
a frame means;

a revolving body held by the frame means above the tool support and capable of rotating about an axis extending in the first horizontal direction;

a first holding means mounted on the revolving body and capable of holding at least two gang heads simultaneously to the revolving body;

a rotating means for rotating the revolving body in such a way that at least two gang heads placed in first and second positions, respectively, are interchanged, the first position being a location at which each gang head is mounted to the tool suport, the first and second positions being disposed on opposite sides of the axis of the revolving body;

tiltable body mounted on the frame means so as to be tiltable about an axis extending in a second horizontal direction perpendicular to the first horizontal direction;



a second holding means mounted on the tiltable body for holding at least one gang head on the tiltable body;

a tilting means for moving the tiltable body between its horizontal and vertical positions to convey said at least one gang head between the second position and a third position which is displaced 90° upwardly and rearwardly from the second position around the axis of the tiltable body;

a gang head magazine mounted on the frame means and capable of indexing a plurality of gang heads within a horizontal plane so that they may move into the third position in turn; and

a guide means which is mounted on the tiltable body and which guides at least two gang heads rotated by the revolving body when the tiltable body is placed in its horizontal position and which cooperates with the magazine to guide the plural gang heads indexed within the magazine when the tiltable body is placed in its vertical position.

4,713,877

METHOD OF FORMING PERMANENT MAGNETS WITHIN A MOTOR YOKE

Edward H. Abbott, Ann Arbor; Robert H. Erickson, West Bloomfield, and William F. Horn, Plymouth, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 5, 1986, Ser. No. 826,435

Int. Cl.[4] H01F *41/00, 1/36;* H02K *15/00*

U.S. Cl. 29—596 **8 Claims**

1. A method of forming multipoled ring magnets comprising the steps of:

preparing a predetermined mixture of a ceramic hexaferrite platelet material;

forming said mixture into a predetermined hollow cylindrical shape;

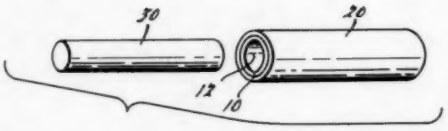
providing a cylindrical metal housing of predetermined dimensions wherein the inside diameter is slightly larger than the outside diameter of said cylindrically formed mixture;

placing said cylindrically formed mixture into said housing;

providing a cylindrical mandrel having a predetermined outer diameter that is slightly less than that of the index diameter of said cylindrical mixture;

evacuating volatile gases from said housing;

hermetically sealing said housing containing said ceramic material mixture and said mandrel;



applying inert gas at predetermined pressure and temperature to said sealed housing for a predetermined period of time to effect densification and platelet alignment of said ceramic material mixture;

allowing said sealed housing to cool;

removing said mandrel;

cutting said housing, bearing the densified ceramic magnetic material, into predetermined lengths and magnetically charging the densified ceramic magnetic material to form multipoled ring magnets.

4,713,878

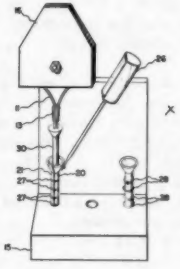
MOLD METHOD FOR SUPERCONDUCTIVE JOINT FABRICATION

Robert C. Kumpitsch, Johnstown, and James P. Retersdorf, Gloversville, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 5, 1984, Ser. No. 678,443

Int. Cl.[4] H01L *39/24*

U.S. Cl. 29—599 **29 Claims**



1. A method for forming superconductive joints in multifilamentary superconductor wire embedded in a metal matrix, said method comprising the steps of:

disposing the ends of the multifilamentary superconductor wires to be joined in a hot liquid metal stripping bath for removal of said metal matrix;

removing said wire ends from said stripping bath;

disposing said wire ends in a hot liquie superconductive solder;

removing said wire ends from said hot liquid superconductive solder;

inserting said wire ends in a mold and filling said mold with hot liquid superconductive solder; and solidifying said solder.

4,713,879

METHOD OF MANUFACTURING A DEVICE HAVING AN ELECTRIC RESISTANCE LAYER AND THE USE OF THE METHOD

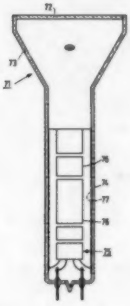
Gerardus A. H. M. Vrijssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 24, 1986, Ser. No. 843,329

Claims priority, application Netherlands, Mar. 28, 1985, 8500905

Int. Cl.[4] B05D *5/12*

U.S. Cl. 29—620 10 Claims



1. A method of manufacturing a device in which a homogeneous electrical resistance layer of a resistive material having a resistivity of at least 10 ohm. cm is formed on an insulating substrate, characterized in that from a stable binder-free suspension containing ruthenium hydroxide and glass particles a layer is provided on the insulating substrate from which an electrical resistance layer, which contains 1–6 percent by weight of ruthenium oxide, is formed by heating.

4,713,880

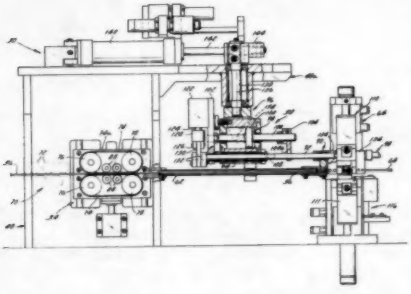
LEAD MAKING MACHINE

Robert O. Dusel, Brookfield; Harold J. Keene, Waukesha, both of Wis.; James Berres, Houston, Tex., and Gerald Blaha, Waukesha, Wis., assignors to Artos Engineering Company, New Berlin, Wis.

Continuation of Ser. No. 849,564, Apr. 8, 1986, abandoned. This application Mar. 11, 1987, Ser. No. 24,887

Int. Cl.[4] H01R *43/04*

U.S. Cl. 29—564.4 11 Claims



1. A lead making machine for accepting insulated wire from a wire source and producing electrical leads, comprising:

a metering means for pushing wire into said machine and measuring the length of wire as it is pushed in;

movble gripping means for gripping said wire and said lead and placing them at certain positions for processing; and flexible tube means for receiving wire from said metering means and directing it to said gripping means regardless of the movement of said gripping means;

a frame-like support member for supporting the various parts;

cutting means located on said support member for cutting the wire once a predetermined length of wire has been pushed into the machine by said metering means, thus creating a lead of predetermined length;

stripping means carried with said cutting means for cutting through insulation on said wire and said lead at adjacent ends thereof approximately simultaneously with the cutting of the wire by said cutting means, and holding the insulation after the cutting;

means for reciprocatingly moving said gripping means axially from an extended position to a retracted position, thereby pulling said wire and said lead out of said stripping means after said insulation is cut, and thereby removing said insulation from the end of said wire and from the end of said lead and creating a stripped wire end and a stripped lead end;

terminal attachment means mounted on said support member for attaching electrical terminals to at least one of said stripped lead end and said stripped wire end;

means for rotating said gripping means about a vertical axis which extends through the approximate center of gravity of said gripping means, to position said stripped wire end and said stripped lead end at said terminal attachment means for attachment of an electric terminal to a least one of said stripped wire end and said stripped lead end; and

electronic visual inspection means for visually inspecting at least one of said stripped wire end and said stripped lead end to determine whether said end is properly stripped within certain predetermined parameters, and for disabling said terminal attachment means from attaching a terminal to an end which does not satisfy those parameters.

4,713,881

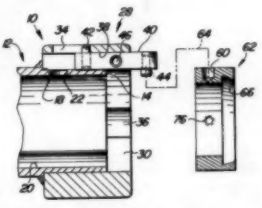
TOOL FOR INSTALLING AN ECCENTRIC LOCKING COLLAR ON A BEARING

Ronald W. Lange, Bettendorf, Iowa; David F. Reynolds, Colona, Ill.; David R. Lolley, Bettendorf, Iowa, and Gary L. Freeman, Hampton, Ill., assignors to Deere & Company, Moline, Ill.

Filed Mar. 11, 1986, Ser. No. 838,652

Int. Cl.[4] B21D *53/10;* B23P *19/04;* B25B *13/14*

U.S. Cl. 29—724 11 Claims



1. A locking collar tool for assembling and tightening an eccentrically cammed locking collar onto a mating eccentrically cammed extended inner race of a bearing, the bearing being mounted on a shaft and accessible from an end of the shaft, rotation of the collar relative to the inner race generating a locking force between the inner race and the shaft and the collar having a generally cylindrical outer surface including a drive hole, comprising:

a sleeve having a holder end and a drive end and a longitudinal axis and including:

a generally cylindrical socket included in the holder end for receiving and holding the collar generally coaxial with the longitudinal axis of the sleeve; and

a tongue carried by the holder end, having a radially

inwardly extending drive pin and being axially shiftable so that the drive pin may move from a receiving position spaced axially outside the collar holding socket and a retaining position axially within the socket, so that the locking collar drive hole may be engaged by the drive pin and collar and tongue may be moved axially so that the collar is supported in the socket with the tongue drive pin drivably engaging the drive hole of the collar.

4,713,882

DEVICE FOR COMPRESSING BY HAMMERING A TUBE OF A STEAM GENERATOR SET IN A TUBE PLATE

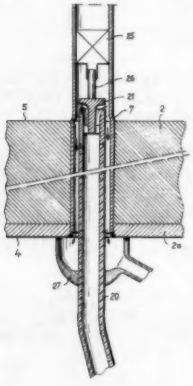
Claude Bianchi, Paris; Yves Fournier, Chatenoy le Royal, and Paul Jacquien, Tassin la Demi Lune, all of France, assignors to Framatome, Courbevoie, France

Division of Ser. No. 795,594, Nov. 6, 1985. This application Sep. 10, 1986, Ser. No. 905,418

Claims priority, application France, Nov. 9, 1984, 84 17130; Jul. 3, 1985, 85 10175

Int. Cl.[4] B23P *15/26*

U.S. Cl. 29—727 **12 Claims**



1. A device for compressing a steam generator tube set in a tube plate so that one end of the tube is flush with a first side of sides of the tube plate and the tube projects from a second opposite side of the tube plate, the setting of the tube having been effected by a rolling of the wall of the tube inside the tube plate between the end of the tube flush with said first side and a zone located in the region of said second side of the tube plate, said device comprising means fixed around the end of the tube flush with said first side of the tube plate in a sealed manner and constituting a case in which is slidable a first flexible tubular sheath, a shaped nozzle carried on an end of the first sheath, and guide means in the tube, suction means connected to the case, and means for injecting gas charged with particles connected to the first sheath, the nozzle having a portion for guiding the particles in a radial direction to the tube when the sheath is introduced in said tube and guided by said guide means.

4,713,883

PRODUCTION LINE FOR PALLET MOUNTED ELECTRIC MOTOR STATORS

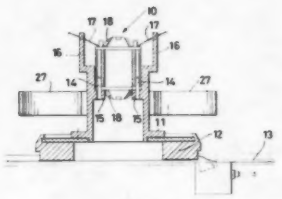
Luciano Santandrea, Tavarnelle Val Di Pesa, and Sabatino Luciani, Sesto Fiorentino, both of Italy, assignors to Axis S.p.A., Italy

Filed Mar. 18, 1986, Ser. No. 840,671

Claims priority, application Italy, Jul. 11, 1985, 21532 A/85; Oct. 21, 1985, 53954/85[U]; Oct. 21, 1985, 53955/85[U]

Int. Cl.[4] B23D *19/00*

U.S. Cl. 29—736 **6 Claims**



1. A production line for electric motor stators, which production line includes a plurality of stator-working stations therein and conveyor belt means in proximity to the stator-working stations for advancing the stators from station to station, comprising a plurality of pallets for rigidly, fixedly, individually supporting stators thereon during movement of said stators from station to station, said pallets including a base which rests on said conveyor belt means, an upwardly-extending hollow body within which the stator is fixed and appendices extending from said body arranged to temporarily receive the ends of wire windings formed on the stator at one of the stator-working stations; and, mechanical means in proximity to the stator-working stations for removing said pallets from the conveyor belt means and for rotating said pallets so that the respective stators become disposed in positions corresponding with the working stations located along the production line.

4,713,884

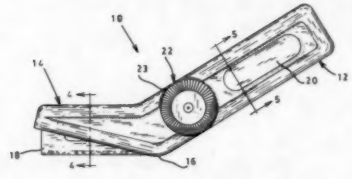
CARPET PAD KNIFE

Cecil A. Dunnagan, 313 Witherspoon, Gallatin, Tenn. 37066

Filed Sep. 8, 1986, Ser. No. 904,208

Int. Cl.[4] B26B *29/00*

U.S. Cl. 30—294 **8 Claims**



1. A knife for cutting carpet pad material without wrinkling said material during cutting, which comprises:

a handle unit, said handle unit having a rearward portion for grasp by a user of said knife, and a forward portion joined at a selected angle to said rearward portion at a heel, said handle divided into a pair of substantially mirror-image first and second side members divided at a median plane extending from said rearward portion to said forward portion, each said first and second side members defining an upper and a lower edge; a knife blade releasably held between said side members at said forward portion, said blade having a straight exposed cutting edge extending from proximate a forward extremity of said forward por-

tion to proximate said heel for cutting said carpet pad material when said knife is moved toward said user, said blade held in said forward portion at an orientation whereby said cutting edge is aligned with said heel and disposed substantially parallel to said carpet pad material during cutting to achieve a slicing action when said rearward portion of said handle is at said selected angle to facilitate grasp of said handle by said user whereby said heel compresses said carpet pad material and said cutting edge slices said pad material without wrinkling thereof during use of said knife; and

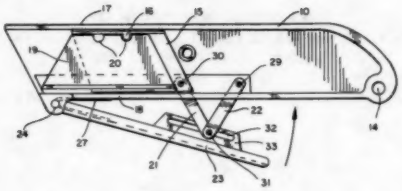
a thumbwheel unit for releasably fastening said side members in side-by-side alignment, said thumbwheel unit having a shaft substantially perependicular with said median plane and a thumbwheel attached to one end of said shaft exterior one of said side members, said thumbwheel extending at least to said upper edge of said first side member to be readily accessible for rotation by a thumb of said user, said shaft penetrating and being rotatable in said first side member adjacent said thumbwheel and threadably engaged with said second of said side members, said shaft provided with an encircling captive washer axially positioned at said median plane whereby counterclockwise rotation of said thumbwheel and said shaft by said user causes said captive washer to move said first side member away from said second member to release said blade from between said side members.

4,713,885

SAFE UTILITY KNIFE

Ronald Keklak, 637 Church St., Amston, Conn. 06231; Michael V. Couture, 228 Pine St., Holyoke, Mass. 01040, and John C. Whitehouse, R.F.D. #1, Winsted, Conn. 06098

Filed Dec. 8, 1986, Ser. No. 939,004
Int. Cl.[4] B26B *1/08*
U.S. Cl. 30—162 **4 Claims**



1. A safe utility knife comprising a handle body portion having a linear guideway, a blade slide and blade mounted for movement in the linear guideway and being shiftable therein between a blade enclosed non-use position to a blade extended use position where the blade projects outside of said guideway, and a toggle mechanism including a pair of toggle links connected between said blade slide and guideway and a lever pivoted to the guideway and having a lost motion connection with said toggle links, means biasing the toggle mechanism in a direction maintaining said blade in the enclosed non-use position, and the handle body portion having substantially a pistol configuration including a hand grip, and said lever being in the form of a trigger at the forward side of the hand grip.

4,713,886

PIERCING TOOL

Takashi Ikeda, 2-19-3 Shinsakae Naka Ku, Nagoya, Japan

Filed Mar. 17, 1986, Ser. No. 840,903
Int. Cl.[4] B26F *1/00*
U.S. Cl. 30—366 **2 Claims**

1. A device for locating an object concealed behind a piercable member which is less resistant to piercing than the concealed object, comprising:

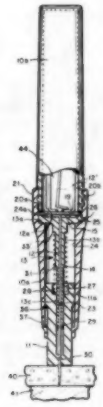
a handle, said handle being elongated and tubular in shape with a forward portion and a rearward portion, said handle having a bore defined therein by an interior sidewall with said bore extending through said forward handle portion,

an elongated needle mounted on said handle, said needle being adapted to be driven through the piercable member by force applied to said handle, said needle being mounted within said handle bore and having a piercing portion with a sharpened end extending beyond said handle, and a shank portion,

a collar member having a portion surrounding and embracing at least a part of said needle piercing portion, said collar member being mounted to telescope within said handle bore during penetration of the piercable member, said collar member having a cylindrical shape with a bore extending therethrough along its longitudinal axis,

a rigid sleeve surrounding said needle shank portion,

said needle piercing portion and a portion of said sleeve being received within said collar member bore with said sleeve embraced therein, said collar member sliding along the outside of said sleeve and the inside of said handle bore during penetration of the piercable member by said needle,



a spring mounted concentric with said sleeve with one end of said spring engaged with said sleeve and another end of said spring engaged with said collar member for biasing said collar member outboard relative to said handle bore such that said collar member portion is proximate said sharpened needle end upon initial penetration of the piercable member by said needle,

said forward and rearward portions of said handle being detachably fixed together, said sleeve including a laterally widened base portion which engages with a shoulder extending within said handle bore to limit outboard movement of said sleeve, said needle shank portion having its inboard end bent normal to the needle axis, said bent needle end being adjacent the inboard side of said base portion when said needle is inserted into said sleeve,

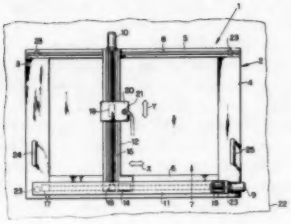
and further including a coin overlying said bent needle end and said sleeve base portion, said coin forming a stop against inboard movement of said needle and base, said coin being forced against said base and said base being forced against said shoulder by a bearing surface formed on said rearward handle portion which engages said coin when said handle portions are fixed together,

location of the object being indicated by an increased resistance to needle insertion after passage of the needle through the less resistant piercable member.

4,713,887
XY TABLE

Koichiro Kitamura, Takaoka, Japan, assignor to Kitamura Machinery Co., Ltd., Takaoka, Japan

Filed Nov. 14, 1986, Ser. No. 930,459
Claims priority, application Japan, Nov. 20, 1985, 60-258786
Int. Cl.[4] G01D *15/16*; B43L *13/02*
U.S. Cl. 33—1 M 7 Claims



1. An XY table comprising:

a frame (2) having a pair of first and second side members (3, 4), a connection member (6) for connecting one end of the first side member (3) with one end of the second side member (4) and a fixed rail member (5) one end of which is fixed to the other end of the first side member (3) and the other end of which is fixed to the other end of the second side member (4) in such a way that the first and second side members (3,4), the fixed rail member (5) and the connection member (6) are arranged in combination so as to increase rigidity of the frame (2);

an auxiliary rail (11) fixed along the connection member (6) in parallel with the rail member (5), the auxiliary rail (11) extending between the first and second side members (3,4);

a movable rail (12) slidable along the rail member (5) and the auxiliary rail (11) while the movable rail (12) is always at a right angle to both the rail member (5) and the auxiliary rail (11);

a first nut (14) fixed to one end of the movable rail (12);

a male screw member (15) engaging the first nut (14) and extending along the auxiliary rail (11);

a first motor (9) placed at one end of the auxiliary rail (11) for rotating the male screw member (15) so that the nut (14) can move along the male screw member (15) between the first and second side members (3,4);

a screw shaft (16) extending along the movable rail (12) between the rail member (5) and the auxiliary rail (11);

a second motor (10) placed at the other end of the movable rail (12) for rotating the screw shaft (16);

a second nut (19) engaging the screw shaft (16);

a moving means (20) fixed to the nut (19) so as to move along the movable rail (12) between the rail member (5) and the auxiliary rail (11) when the second motor (10) rotates the screw shaft (16);

a working head (21) attached to the moving means (20) for processing an object (22), such as a plasma cutting torch, a machining tool or marking-off means;

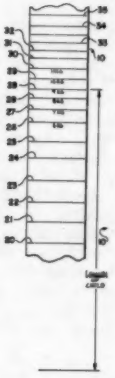
setting means (23) fixed to the frame (2) for detachably setting the frame (2) to the object (22); and

means (67, 68, 69, 76, 77) electrically connected to the first and second motors (9, 10) for controlling position of the working head (21).

4,713,888
MEASURING TAPE FOR DIRECTLY DETERMINING PHYSICAL TREATMENT AND PHYSIOLOGICAL VALUES

James B. Broselow, 24 White Eagle Ranch, Hickory, N.C. 28601

Continuation-in-part of Ser. No. 789,497, Oct. 21, 1985, abandoned. This application Sep. 23, 1986, Ser. No. 910,490
Int. Cl.[4] G01B *3/02*
U.S. Cl. 33—137 R 8 Claims

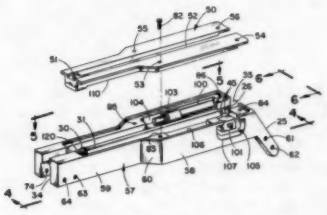


1. A measuring tape for measuring the heel-to-crown height of a patient, said measuring tape having indicia thereon representing increments of a physical treatment value based upon a direct correlation between the heel-to-crown height of a patient and that treatment value.

4,713,889
ILLUMINATED GUNSIGHT

Julio A. Santiago, 13713 Susan La., Burnsville, Minn. 55337

Filed Nov. 14, 1986, Ser. No. 930,864
Int. Cl.[4] F41G *1/32*
U.S. Cl. 33—241 18 Claims



1. An illuminated sighting device for external attachment to a weapon to enable a user to aim and shoot a weapon in daytime or low-light conditions comprising:

a housing for external attachment to a weapon, said housing having a front end and a rear end, said housing including a sighting channel extending along said housing, said sighting channel having a bottom section;

a light-emitting diode located in the bottom of said sighting channel to form a first illuminated sight of a first intensity, said light-emitting source attached to one end of said housing;

a light-conducting rod having a first end and a second end, said first end of said light-conducting rod located adjacent said light-emitting diode to transmit illumination from said light emitting diode to said second end of said light-conducting rod to form a second illuminated sight, said sec-

ond illuminated sight located in the bottom of said sighting channel and attached to said housing, said second illuminated sight of a second intensity, said second intensity different from said first intensity, said second illuminated sight and said first illuminated sight spaced from each other to enable a user to aim a weapon attached to said housing during low-light conditions; and

means in said housing to permit alignment of said sighting device with respect to a weapon attached thereto.

4,713,890

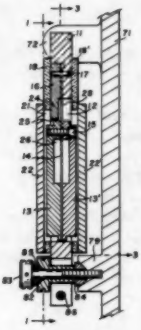
MISLEVEL SENSING DEVICE

Leon W. Wells, Closter, and Werner Hauschild, Whippany, both of N.J., assignors to Cubic Corporation, San Diego, Calif.

Filed Jan. 12, 1987, Ser. No. 2,419

Int. Cl.[4] G01C *9/06, 9/12*

U.S. Cl. 33—366 **13 Claims**



13. In a pendulum assembly comprising an elongate leaf spring member having a significantly greater width than thickness and being fixedly clamped at its respective ends between planar face pairs of a body member and a weight member, thereby suspending said weight member for gravity-influenced movement with respect to said body member with resulting flexure of said leaf member, the improvement comprising an opening through said leaf member substantially centrally-disposed in the width thereof intermediate and spaced from said body and weight members and having a width significantly reducing the cross-sectional area of said leaf member in the region of said opening, thereby concentrating the flexure of said leaf in said region and away from the edges of said body member face pair.

4,713,891

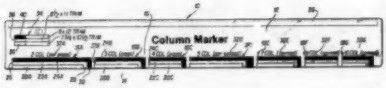
COLUMN MARKER

Nancy M. Cayton, Fairmount, W. Va., assignor to Educational Experiences, Inc., Fairmount, W. Va.

Filed Mar. 9, 1987, Ser. No. 23,358

Int. Cl.[4] B43L *7/00;* **G01B** *3/04*

U.S. Cl. 33—494 **9 Claims**



1. A book page column marker for providing indications of appropriate column widths of material to be printed on book pages, said column marker comprising:

an elongated ruler member defining a straightedge along one edge thereof and a display surface adjacent said straightedge for displaying indicia;

indicia on said display surface including a plurality of sets of elongated bars, each of said sets having a plurality of side-to-side adjacent bars, each bar being parallel to said straightedge and to each other but not being in side-to-side adjacent relationship to bars in another set, at least one of said bars in each of a plurality of said sets being longer than the other bars of the set, said indicia further including lines perpendicular to said straightedge extending from the ends of each elongated bar to said straightedge, said indicia further including set-identifying indicia for identifying each bar set to be used for marking a particular number of columns to be printed on a book page and said indicia further including bar-identifying indicia for identifying the particular size book pages with which each bar in each set is to be used;

wherein the length dimension of each bar corresponds to the width of a column for the number of columns indicated by the set-identifying indicia for its respective set and for the size of the page as indicated by the bar-identifying indicia for the respective bar;

whereby a user who wishes to layout material to be printed on a page decides how many columns of printed material per page he wishes to have, chooses the particular elongated-bar set on the marker corresponding to said number of columns per page, ascertains the size of the page on which he wishes to print material, chooses the particular elongated bar in said particular elongated bar set corresponding to that size page, and uses said particular elongated bar to layout columns on the page.

4,713,892

APPARATUS FOR THE PROTECTION OF A MOVABLE ELONGATE MACHINE PART

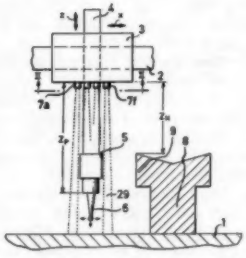
Bernhard Strauss, Nattheim, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenhime/Brenz, Oberkochen, Fed. Rep. of Germany

Filed Jul. 8, 1986, Ser. No. 910,123

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1985, 3527063

Int. Cl.[4] G01B *7/28*

U.S. Cl. 33—559 **10 Claims**



1. In a multiple-coordinate measuring machine wherein an elongate quill carries a work-contact probe-equipped probe head at its outer end and is guided for x-axis positioning in a carriage having x-y displaceability, an angularly distributed plurality of ultrasonic echo-ranging transducers mounted to said carriage at uniform radial and angular spacing about said quill, each of said transducers being oriented for directional response on an axis substantially parallel to the quill axis and in radial clearance with said probe head, whereby a generally annular envelope of directional ultrasonic-response capability surrounds said probe head for various z-axis positions thereof, separate x, y, and z-axis drives for said carriage and quill, and ultrasonic proximity-detection circuitry associated with said transducers and operative to modify at least one of said drives upon proximity detection of an object within the field of at least one of said transducers, said proximity-detection circuitry including means limiting the operative range of proximity

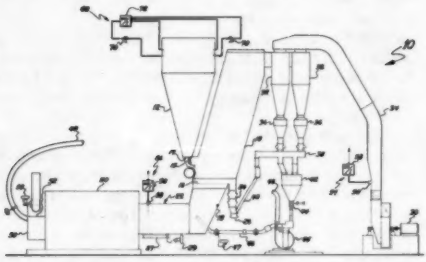
detection to distances less than at least the effective z-axis extent of said quill and probe.

4,713,893

THERMAL DRYER CONTROL SYSTEM

Frederick A. Webb, Bethel Park, Pa., assignor to Consolidation Coal Co., Pittsburgh, Pa.

Filed Oct. 31, 1986, Ser. No. 925,759
Int. Cl.[4] F26B *21/06*
U.S. Cl. 34—25 **4 Claims**



1. A method for controlling the weight of wet material in a storage means to be dried by a thermal drying system comprising the steps of,

feeding wet material into a storage means,

withdrawing said wet material from said storage means,

introducing said wet material onto a support means within a drying chamber,

moving said support means within said drying chamber with said wet material positioned thereon,

passing hot gas delivered from a source over said wet material,

measuring the temperature of said hot gas after said hot gas has passed over said wet material on said support means,

regulating the temperature of said hot gas after said hot gas has passed over said wet material to a preselected temperature independently of the temperature of said hot gas delivered from said source by controlling the amount of wet material introduced onto said support means within said drying chamber,

continually measuring the weight of said wet material within said storage means,

increasing the temperature of said hot gas delivered from said source when said wet material weight exceeds a predetermined amount, so that the temperature of said hot gas after said hot gas passes over said wet material exceeds said preselected temperature, and

increasing the amount of said wet material introduced onto said support means within said drying chamber to control said temperature of said hot gas after said hot gas passes over said wet material to said preselected temperature and thereby reducing the weight of said wet material within said storage means to said predetermined amount.

4,713,894

AUTOMATED DRYER CONTROL SYSTEM

Philip M. Roth, Garfield; Nathan M. Itskovitch, Hillsdale, and Arthur Sussman, Alpine, all of N.J., assignors to Intraspec, Inc., Bogota, N.J.

Filed Aug. 7, 1984, Ser. No. 638,416
Int. Cl.[4] F26B *21/10*
U.S. Cl. 34—30 **27 Claims**

11. A method for automatically controlling the operation of a dryer, comprising:

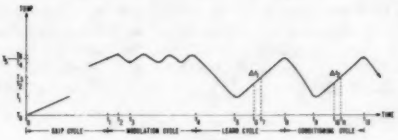
cyclically applying heat to the load to be dried so that the temperature of the load varies cyclically in a series of cycles including a learn cycle and one or more conditioning cycles subsequent to said learn cycle;

determining the time interval for the load to be dried to reach one predetermined temperature from another predetermined temperature during said learn cycle and during each of said conditioning cycles;

providing adjustable frequency clock pulses;

adjusting the frequency of said clock pulses so that a predetermined number of clock pulses are produced during a time equal to said time interval determined during said learn cycle;

totalizing said clock pulses during the time interval determined during each of said conditioning cycles;



comparing said totalized number of clock pulses for each of said conditioning cycles to said predetermined number of clock pulses; and

ending the application of heat in response to the occurrence of a predetermined relationship between said totalized number of clock pulses for one of said conditioning cycles and said predetermined number of clock pulses, whereby application of heat is ended when the thermal response exhibited by the load in said conditioning cycles bears a predetermined relationship to the thermal response exhibited by the load during said learn cycle.

4,713,895

SPORTS SHOE COVER

Francois Vallières, 545 Poulin, Thetford Mines, Quebec, Canada G6G 4T8

Filed Jul. 8, 1986, Ser. No. 883,370
Int. Cl.[4] A43B *3/02, 3/00*
U.S. Cl. 36—1.5 **5 Claims**

1. A protective gaiter for sports shoes comprising a first flexible sheet portion completely covering the upper and heel of the sports shoe, and a second flexible sheet portion covering the ankle and lower calfs of a wearer, a first hook and pile type fastener tape fixed in spaced-apart areas about the periphery of the sole of the sports shoe, and cooperating second hook and pile type fastener tape fixed to the lower margin of the first sheet portion at spaced-apart locations for attachment to the first fastener tape, said fastener tapes being distributed over the toe area and along the sides of the sole of the shoe at a plurality of locations, the first and second tapes cooperating to retain the gaiter on the shoe to thereby inhibit flapping of the gaiter relative to the shoe during running, whereby ventilation openings are provided between the spaced-apart fastening tapes.

4,713,896

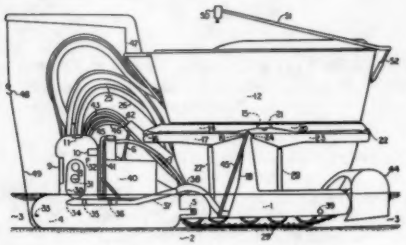
INSHORE SUBMERSIBLE AMPHIBIOUS MACHINES

Eric G. Jennens, 1978 McDougall Street, Kelowna, British Columbia, Canada V1Y 1A3

Continuation-in-part of Ser. No. 631,764, Jul. 17, 1984, abandoned, and a continuation-in-part of Ser. No. 478,882, Mar. 23, 1983, abandoned, and a continuation-in-part of Ser. No. 358,602, Mar. 15, 1982, abandoned, and a continuation-in-part of Ser. No. 249,602, Apr. 10, 1981, abandoned. This application Sep. 6, 1985, Ser. No. 773,181

Int. Cl.[4] B63G *8/00*

U.S. Cl. 37—54 **57 Claims**



1. A submersible amphibious vehicle comprising: as a self-contained unit means, at least one open-bottomed pneumatic chamber means adapted to house personnel and equipment on land, on water or underwater; a propulsion unit means connected by means to said chamber and provided with means for propelling it on land, in the air, on the floor of a body of water, on the surface of the water, and anywhere in between; a safety chamber unit means resting on said propulsion unit means and connected thereto by an extendable linkage means whereby as said vehicle progresses from dry land into deeper water said propulsion unit means remains on the bottom of said water; said safety chamber means remains on said water surface as said linkage means extends, said safety chamber means being of sufficient displacement to carry said propulsion unit means and said open-bottomed pneumatic chamber means, whreby said propulsion unit means and its attached open-bottomed pneumatic chamber means are lifted from the bottom through said linkage means as the depth of water exceeds the maximum extension of said linkage means.

4,713,897

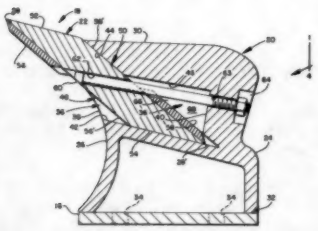
REVERSIBLE DIGGING TEETH AND HOLDER THEREFOR

Charles W. Hemphill, 1106 Green Valley La., Duncanville, Tex. 75116

Filed Apr. 22, 1985, Ser. No. 725,434

Int. Cl.[4] E02F *5/06*

U.S. Cl. 37—83 **3 Claims**



3. In a digging machine of the type having an endless chain to which a plurality of tooth receiving holders are attached, with there being a digging tooth removably received within each holder, the improvement comprising:

said holder includes means forming a forwardly opening tooth-receiving pocket within a forward marginal end thereof, means by which said holder can be attached respective to a digging machine for excavating material;

said tooth is in the form of a frustum of a polygon, said polygon has oblique faces (**48, 50**) arranged in opposition to one another and means at each marginal end of each face which define cutting edges (**56, 58**) which extend from and are parallel to said faces (**48, 50**), said cutting edges of the tooth being provided with a layer of hard surfacing material which increases the thickness of the tooth, the cutting edges being arranged parallel to one another;

said pocket receives one of the opposed marginal ends of the tooth therewithin, with the cutting edge (**58**) of said one opposed marginal end residing within the pocket, means by which the configuration of the pocket is made complementary respective to the configuration of the marginal end of the tooth which is received therewithin so that one oblique face (**58'**) and one sidewall (**54**) of the tooth engages the pocket sidewalls (**42, 44**) in close tolerance relationship;

said pocket has a entrance defined by a forward end of the holder which terminates in a shoulder (**44**), said shoulder lies within a plane which is parallel to the opposed faces (**48,50**) of the tooth; said pocket includes another inner wall (**42**) which is aligned parallel respective to the opposed ends of said tooth, and abuttingly engages the end (**54**) of the tooth which is enclosed within said pocket;

said polygon is a quadrilateral and the oblique faces are in the form of diamonds having apexes at the corners of the quadrilateral;

and fastener means for releasably holding the tooth in attached relationship within the pocket.

4,713,898

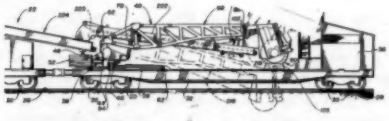
RAILROAD MOUNTED TRENCH DIGGER

Timothy B. H. Bull, Annandale, and Raymond C. Wahl, Minnetonka, both of Minn., assignors to Loram Maintenance of Way, Inc., Hamel, Minn.

Filed Dec. 16, 1985, Ser. No. 809,150

Int. Cl.[4] E02F *5/08, 3/24*

U.S. Cl. 37—96 **7 Claims**



1. A railroad mounted trenching apparatus for digging a ditch in the ground along a road bed for a railway, comprising:

a carriage having opposed sides and including rail engaging wheels for mounting said carriage on a railway;

a boom base rotatably carried by said carriage at a generally upright boom base pivot axis;

a cutting head support boom pivotably carried by said boom base;

a cutting head for disturbing said ground into a loosened composite, operably carried by said support boom forwardly of said boom base pivot axis;

first power means operably coupled to said support boom for pivoting said support boom about said boom base between raised and lowered positions;

second power means operably coupled to said boom base for rotating said boom base about said generally upright boom base pivot axis;

first conveyor means extending along said cutting head support boom for conveying said loosed composite from

said cutting head to a first conveyor means discharge end rearwardly of said boom base pivot axis;

second conveyor means pivotally carried by said boom base at a generally upright second conveyor means pivot axis oriented rearwardly of said boom base pivot axis, said second conveyor means including a second conveyor means discharge end rearwardly of said second conveyor means pivot axis and a second conveyor means receiving end oriented forwardly of said second conveyor means pivot axis below said first conveyor means discharge end,

whereby said support boom and said first conveyor means clears said second conveyor means when said cutting head is rotated about said boom base pivot axis for positioning said cutting head on either side of said carriage,

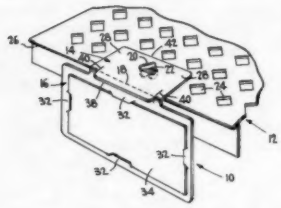
and said second conveyor discharge end remains substantially stationary relative to said carriage as said cutting head is shifted from side to side of said carriage.

4,713,899

INFORMATION DISPLAY ELEMENT FOR SHELF AND PRICE CHANNEL USE

Jacob Fast, 7561 NW. 9th St., Plantation, Fla. 33317

Filed Oct. 7, 1986, Ser. No. 916,368
Int. Cl.[4] G09F *3/18*; A47B *96/06*
U.S. Cl. 40—10 R **6 Claims**



1. A display element for attachment to an apertured shelf for displaying product information at a forward edge of the shelf, the display element comprising a plastic sheet having a display panel and an attachment panel with a fold line extending transversely across the sheet substantially at a junction between the panels, the attachment panel including a slit defining a depressable head for working into an aperture of the shelf adjacent to the forward edge and thereby attaching the element to the shelf in a manner allowing the display panel to be folded down about the fold line in front of the shelf, the slit further defining sections of the attachment panel adjacent the head for engaging an upper surface of the shelf and precluding upward tilting of the element wherein the sheet includes a generally transversely located channel-shaped slit having an elongate base portion adjacent and parallel the fold line, and orthogonal limbs extending from the base portion toward a free end edge of the attachment panel to form a portion of the sheet defined between the base portion of the slit and said free edge for flexing into a concave price channel with the display panel extending below the price channel to form a price channel flag.

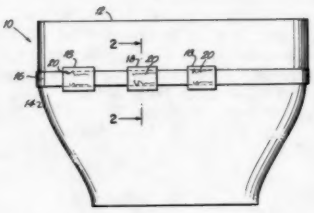
4,713,900

BOWL EMBLEMS

Luther Calloway, Jr., and George Spector, both of 233 Broadway Rm 3615, New York, N.Y. 10007

Filed Dec. 10, 1984, Ser. No. 680,326
Int. Cl.[4] G09F *3/00*
U.S. Cl. 40—324 **2 Claims**

2. An emblem with reversible opposite sides having means on each side adapted to be slidingly mounted respectively on an internal track and an external track comprising a groove with a first flange on one side superimposed on an opposite of said groove, said second flange including flexible spaced arms



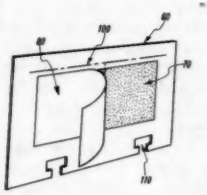
whereby said first flange is adapted for an internal track and said second flange and arms is adapted for an external track.

4,713,901

SYSTEM FOR RETAINING AND DISPLAYING BUSINESS CARDS

Virginia J. Wells, and Gerald B. Klein, both of Broomfield, Colo., assignors to Gerald B. Klein, Broomfield, Colo.

Filed Feb. 3, 1986, Ser. No. 825,385
Int. Cl.[4] B42F *19/04*
U.S. Cl. 40—360 **5 Claims**



1. A system for retaining and displaying conventional business cards, said system comprising:

a frame means for holding a multiplicity of file cards in the form of planar sheets;

at least one file card being disposed in said frame means;

means for removably attaching each said file card to said frame means;

adhesive means disposed on and covering a portion of a surface of each file card;

a protective peel-off covering disposed over the adhesive means, said covering being removable to expose the adhesive means; registration means provided on said file card to at least one side of the area of adhesive, said registration means delimiting the edge of a conventional business card to be affixed to the file card; and

a conventional business card affixed to at least one file card by and in juxtaposition over said exposed adhesive means such that said business card is displayed.

4,713,902

AMBIDEXTROUS OR LEFT-HANDED MAGAZINE CATCH FOR A PISTOL

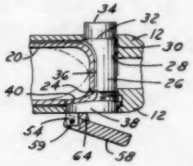
Kevin Wigton, 11245 Old Hamburg Rd., Hamburg, Mich. 48139

Filed Oct. 23, 1985, Ser. No. 790,399
Int. Cl.[4] F41C *27/00*
U.S. Cl. 42—7 **5 Claims**

1. In a piston comprising a barrel, a handle and a magazine insertable in the handle, said handle including a transverse button pin extending from the left side of the handle and integral means extending from the button pin to engage and release the insertable magazine,

the improvement comprising a lever on the right side of the

handle, means on said integral means extending from said button pin and on the lever for engagement therebetween



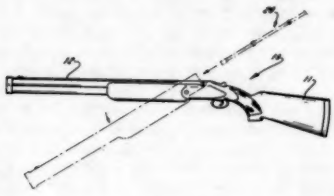
and a bifurcated fulcrum on said lever in engagement with said handle and astraddle said button pin.

4,713,903

CHOKE ASSEMBLIES FOR SHOTGUNS

Donald R. Mainland, Racine, Wis., assignor to Kolar Arms, Racine, Wis.

Filed Jun. 2, 1986, Ser. No. 869,351
Int. Cl.[4] F41C *21/10, 27/00*
U.S. Cl. 42—79 **2 Claims**



1. A choke assembly for installation in the bore of the barrel of a shotgun of predetermined gauge to reduce the gauge of the shotgun bore and to provide a shot pattern of a predetermined characteristic comprising:

a tube having a breech end and a muzzle end, said tube comprising a tube bore having a gauge less than said predetermined gauge, said tube comprising integrally formed axially spaced apart supporting bosses on the exterior thereof of nearly the same diameter as said bore of said shotgun barrel, at least one of said supporting bosses on said tube being located near the muzzle end of said tube, said tube being fabricated of metal selected from a class of metals consisting of aluminum, magnesium and alloys thereof;

a choke having a breech end and a muzzle end, said choke comprising a choke bore, said choke comprising at least two integrally formed axially spaced apart supporting bosses on the exterior thereof of nearly the same diameter as said bore of said shotgun barrel, one of said two supporting bosses being located near said breech end of said choke and the other being located near said muzzle end of said choke, said choke being fabricated of metal selected from a class of metals consisting of steel, stainless steel, titanium and alloys thereof;

and connecting means for connecting said breech end of said choke and said muzzle end of said tube and comprising external threads on said breech end of said choke and internal threads in said muzzle end of said tube which are inter-engaged with each other and solidified adhesive disposed therebetween, said internal threads on said tube being formed within said one supporting boss located at said muzzle end of said tube;

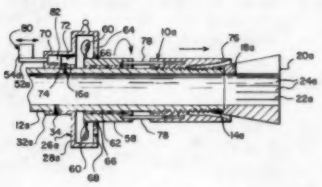
and said external threads on said choke being formed adjacent said one supporting boss located near said breech end of said choke.

4,713,904

AUTOMATIC CHOKE SHOT GUN

Mark S. Anderson, 812 N. 80th Pl., Kansas City, Kans. 66112, and George Spector, 233 Broadway, RM 3615, New York, N.Y. 10007

Filed Jun. 16, 1986, Ser. No. 874,559
Int. Cl.[4] F41C *21/00*
U.S. Cl. 42—79 **2 Claims**



1. An automatic shotgun choke which comprises:

(a) a shotgun barrel having an externally threaded muzzle and circumferentially spaced radially disposed gas ports extended therethrough spaced rearwardly from said muzzle;

(b) a collar threaded on said muzzle of said shotgun barrel, said collar having a choke sleeve with a tapering outer surface extended forwardly therefrom, said sleeve having radially disposed slots extended therethrough providing fingers with the outer diameter of said sleeve gradually enlarging from said collar to forward end of said sleeve;

(c) a choke assembly mounted on said muzzle, said assembly extending from a point rearwardly of said radially disposed gas ports through said shotgun barrel to said fingers, a rearward end of said assembly having an annular portion mounted on the outer surface of said shotgun barrel providing a gas chamber having exhaust holes, said portion having an annular flange extended rearwardly therefrom, said flange being secured to said shotgun barrel;

(d) a gas operated member in said chamber moveably mounted on said shotgun barrel and positioned forwardly of said radially disposed gas ports through said shotgun barrel, said gas operated member being activated by pressure of gases of combustion passing through said radially disposed gas ports of said shotgun barrel;

(e) a choke ring forming part of said choke assembly extending partially around said fingers;

(f) means connecting said choke ring to said gas operated member whereby gases of combustion passing through said radially disposed gas ports in said shotgun barrel actuate said member causing said choke ring to move forward thereby constricting said fingers of said sleeve;

(g) means for adjusting the gas port size comprising a valve member slidable over said ports having an external operation shaft extending into said chamber for adjusting said valve, wherein

(h) said gas operated member having radially disposed fan blades extended therefrom and said member being rotatably mounted on said shotgun barrel;

(i) wherein said choke assembly surrounds said fan blades of said member and has a first annular web having an annular sealing member extending to the outer surface of said shotgun barrel;

(j) said portion including a vent rib having inlet ports therethrough formed on upper portion of said flange, said inlet ports positioned over said gas ports with said vent rib communicating with said chamber to allow pressure of gases of combustion to pass through said gas ports of said shotgun barrel to rotate said fan blades then leave through said exit ports;

(k) said choke ring being threaded on said muzzle of said shotgun barrel rearwardly of said collar; and

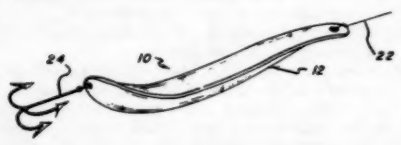
(l) said gas operated member including telescopic rods con-

necting said gas operated member to said choke ring whereby gases of combustion passing through said casing will turn said member to rotatably drive said choke ring forwardly contracting said fingers of said sleeve.

4,713,905
ATTACHMENT FOR A FIREARM
Timothy C. Dupuy, 12416 S. Harrells Ferry Rd., Bldg. 4-D, Baton Rouge, La. 70816
Filed Dec. 17, 1986, Ser. No. 942,738
Int. Cl.[4] F41C *23/02*
U.S. Cl. 42—85 7 Claims

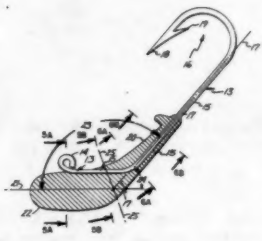
1. A rear sling attachment for a firearm having a longitudinally extending stock and a butt plate at the rear end of the stock, said attachment comprising a plate member attached between the stock and butt plate and extending vertically between top and bottom edges of the stock, said plate being dimensioned equally as the end of the stock and butt plate whereby the edges of said plate lie flush with the edges of said stock and butt plate, and said plate having sleeve means extending downwardly and forwardly from the bottom edge thereof for receiving a swivel on the rear end of a firearm sling whose front end is attached to the front end of the firearm.

4,713,906
FISHING LURE OF THE SPOON TYPE
Patsy S. Distaffen, 278 Brayton Rd., Rochester, N.Y. 14616
Filed Dec. 9, 1985, Ser. No. 806,452
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.5 5 Claims



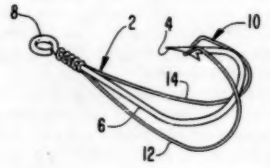
1. A fishing lure of the spoon type, said lure comprising:
a body member having rounded leading and trailing edges and defining openings adjacent to said leading and trailing edges respectively for attaching a fishing line and a fishing hook to said body member, said leading edge having a radius of curvature less than the radius of curvature of the trailing edge, said body member further having a convex portion measured from said leading edge toward said trailing edge and a concave portion measured from said trailing edge toward said leading edge, the radius of curvature of said convex portion being critically related to the radius of curvature of the concave portion so as to be approximately equal to four times the radius of curvature of said concave portion, whereby due to the particular shape of said body member, when said body member is towed in the water by a fishing line, said body member will move in unpredictable directions and will wobble about its longitudinal axis so as to attract fish to said hook irrespective of towing speed.

4,713,907
UPRIGHT JIG
David H. Dudeck, White Bear Lake, Minn., assignor to Heron Manufacturing, Inc., Little Canada, Minn.
Filed Apr. 29, 1987, Ser. No. 43,867
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.39 12 Claims



1. A fishing jig comprising:
a fishhook means having a shank with an eye at one end thereof and joined oppositely from said eye along a major axis thereof to a hooking portion that substantially curves about toward said eye to end in a point;
an orienting body of a mass greater than that of said fishhook means affixed to said shank by a connection portion of said orienting body to extend past, though leaving exposed, said eye so that most of said mass of said orienting body is located in a platform portion thereat on that side of said eye opposite said hooking portion where joined with said shank, said orienting body connection portion being joined with said orienting body platform portion at a body intersection, said platform portion being arranged substantially about a reference plane which reference plane is intersected by said shank major axis in passing through said reference plane at an intersection angle which is other than a right angle, and said platform portion, in being so arranged, extends substantially radially outward along said reference plane from said body intersection relatively far in a single selected first angular range as compared to its radial extent in said reference plane in a second angular range which includes those angles outside said first angular range with sides of said platform portion, where intersected by said reference plane, lying substantially along radii at least near said body intersection.

4,713,908
BAIT GUARD FOR A FISH HOOK
Newsome E. Corbitt, III, 3724 Beauclerc Rd., Jacksonville, Fla. 32217
Filed Jul. 9, 1986, Ser. No. 884,176
Int. Cl.[4] A01K *83/00*
U.S. Cl. 43—43.4 14 Claims



1. A bait guard for use with a fish hook, said fish hook having a rearward eye portion, a shank portion, and a forward hook portion, said bait guard comprising:
means for guarding bait, said means being attached to the eye portion, comprising:
an elongated flexible member secured to the eye portion,

extending forwardly along at least one side of the shank portion, following the curve of the hook portion and extending rearwardly to and in engagement with a barb on the end of the hook portion.

4,713,909

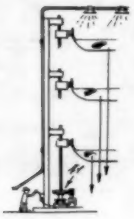
INDOOR AND OUTDOOR CLOTH FARM

Peter Roper, 957 E. 224th St., Bronx, N.Y. 10466, and George Spector, 233 Broadway, 3615 Woolworth Bldg., New York, N.Y. 10007

Continuation of Ser. No. 905,475, May 12, 1978, abandoned. This application Mar. 29, 1982, Ser. No. 363,292

Int. Cl.[4] A01G *9/02*

U.S. Cl. 47—17 **4 Claims**



1. A plant cultivator comprising a cloth structure adapted to hold cultivating material for growing plants with means for varying retention of irrigating liquid in said cultivator in combination with means for supporting said structure in horizontal position at various elevations above a base surface wherein said structure includes a plurality of vertically spaced superimposed sections, first said means comprising removable cloth layers.

4,713,910

BARRIER POST FOR PARKING LOTS AND PASSAGEWAYS

Heinrich Quante, Recklinghausen, Fed. Rep. of Germany, assignor to ARMO Gesellschaft fur Bauelemente, Bau - und Wohnbedarf GmbH, Recklinghausen, Fed. Rep. of Germany

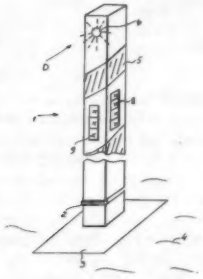
PCT No. PCT/DE85/00518, § 371 Date Aug. 12, 1986, § 102(e) Date Aug. 12, 1986, PCT Pub. No. WO86/03531, PCT Pub. Date Jun. 19, 1986

PCT Filed Dec. 10, 1985, Ser. No. 907,685

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1984, 3445218; Apr. 23, 1985, 3514626

Int. Cl.[4] E01F *13/00*

U.S. Cl. 49—49 **13 Claims**



1. Barrier post for the temporary blocking of access to parking places, driveways and access roads, the post being anchored in the ground and swingable around an articulation located in the ground area, the articulation extending transversely to the longitudinal axis of the post, characterized in that the post is provided with a drive activating an oscillation around the articulation, said drive being actuatable by means of a receiver reponsive to a portable emitter;

said post being arranged to be inclined in the approach direction and said drive being set to keep the post locked in an erect position;

said post built as a hollow bar housing the drive and the receiver with the articulation being a hinge;

said drive operating a capstan whose cable end is fastened in the ground in front of the post considered in the approach direction, and is guided over a deflecting roller in an area near the hinge; and

said drive being an electromotor supplied by solar cells which are distributed over an external surface of the post.

4,713,911

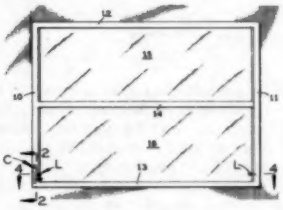
AUXILIARY WINDOW LOCK

John B. Maguire, 1412 SW. 28 Ave., Deerfield Beach, Fla. 33441

Filed Nov. 24, 1986, Ser. No. 933,857

Int. Cl.[4] E05C *17/00*

U.S. Cl. 49—394 **6 Claims**



1. In combination with an awning window having:

a frame bordering a window opening;

a plurality of window panels in said frame in succession vertically;

and a mechanical linkage operatively coupled to said panels for adjusting said panels between substantially vertical closed positions and open positions at acute angles to the vertical, said linkage including a movable rigid linkage arm which in one position causes said linkage to position said window panels in their closed positions;

the improvement wherein:

said linkage arm and said window frame adjacent said linkage arm have holes which are aligned in said one position of said linkage arm;

said improvement further comprising:

a locking pin snugly but slidably insertable in and removable from said aligned holes in the window frame and said linkage arm in said one position of said linkage arm.

4,713,912

LENS AND PATTERN HOLDER

Georges Zoueki, 4812 Verdun Avenue, Verdun, Quebec, Canada H4G 1N1

Filed Mar. 18, 1986, Ser. No. 840,930

Claims priority, application Canada, May 8, 1985, 481082

Int. Cl.[4] B24B *9/14*

U.S. Cl. 51—101 LG **7 Claims**

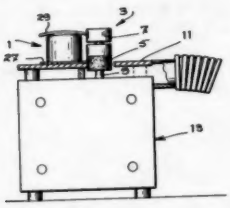
1. A lens and pattern holder for use with a grinding tool comprising a rotary grinding ring mounted in coaxial relationship with respect to a guiding ring of the same diameter, said holder comprising:

a solid body having a pair of opposite surfaces spaced apart so that the peripheries thereof respectively face said grinding ring and guiding ring, said solid body having a main axis perpendicular to its opposite surfaces;

means on one of said opposite surfaces for detachably connecting thereto a relatively thin pattern having a peripherical edge extending away from the periphery of said one surface, said connecting means comprising a single set of two pins spaced apart on said one surface and projecting therefrom to engage a pair of corrsponding holes provided in said pattern, said pins extending substantially through said pattern and being symmetrically positioned with respect to the main axis of said body;

means on the other of said opposite surfaces for detachably mounting thereon a lens, said mounting menas comprising a sticking pad; and

visual means on said other surface for use as a guide to properly position and align the lens with respect to the pattern connected to the one surface of said body when mounting said lens onto said other surface, said visual means comprising three visible dots aligned onto said



other surface of said body so as to extend in a plane passing through the axes of the pins, one of said dots being centrally positioned onto the main axis of said body while the two other dots are symmetrically positioned close to the periphery of said other surface,

whereby a finished lens mounted on the other surface of said body can be used as a guide for shaping and finishing the peripherical edge of a blank pattern connected to the one surface of said body, such a shaping and finishing being obtained by pressing and rotating said finished lens and blank pattern against said guiding ring and said grinding ring, respectively, or, alternative, a finished pattern mounted on the one surface of said body can be used as a guide for shaping and finishing the peripherical edge of a lens, such a finishing being obtained by pressing and rotating said finished pattern and said lens against said guiding ring and said grinding ring, respectively.

4,713,913

AIR SLIDE POSITIONING FOR GRINDING SPINDLES

Meryle D. W. Adler, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Jul. 9, 1986, Ser. No. 883,744
Int. Cl.[4] B24B *49/08*
U.S. Cl. 51—165.9 **10 Claims**

1. In a machine for shaping a workpiece, said machine having a tool and holder for said workpiece, an improved air slide for precisely determining the relative position between said tool and a center line of a rotary table upon which it is mounted comprising:

a center rail;

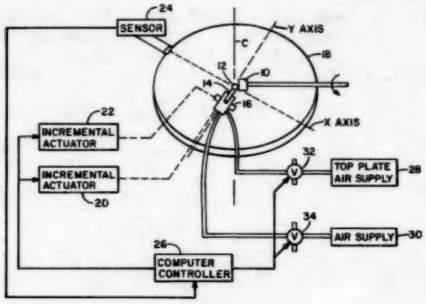
a carriage mounted for linear travel on said rail, one of said tool and said holder being mounted on said carriage;

said carriage comprising an upper plate, two side guides and a bottom plate;

means for directly supplying a thin film of air between said center rail and said carriage not greater than about 10 microinches so that said carriage can be moved linearly on said rail to precise alignment between said tool and said center line of said rotary table;

said means for supplying a thin film of air directly to said carriage including two independent air supplies, a first supply at a first pressure for said upper plate and a second supply at a lesser second pressure for said side guides and bottom plate, and said first supply having a first pressure greater than the pressure of said second supply sufficient to overcome the force generated by the weight on said carriage and the force of air from said second supply on the top surface of said bottom plate;

means for selectively stopping the supply of said air to lock said carriage on said rail in the position of said precise alignment; and



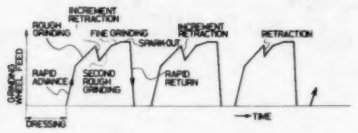
said means for selectively stopping the supply of aid air includes a valve for stopping said first supply of air to said upper plate wherein the force of air from said second supply locks said carriage in place when said first supply of air is stopped, without materially affecting the flow of air from said second supply.

4,713,914

INTERNAL GRINDING METHOD

Jinichiro Oshima, Narashino, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Chiba, Japan

Filed Jan. 28, 1986, Ser. No. 823,207
Claims priority, application Japan, Jan. 29, 1985, 60-15001
Int. Cl.[4] B24B *5/00, 17/00*
U.S. Cl. 51—281 P **10 Claims**



1. A grinding method for grinding a workpiece in repeated grinding cycles during which a grinding tool undergoes advancing movement relative to the workpiece to grind a surface of a workpiece and relative retracting movement from the ground surface of the workpiece through a correction distance to correctively grind the ground surface, the method comprising the steps of: dressing a grinding tool; repeatedly carrying out one grinding cycle during which the dressed grinding tool undergoes relative retracting movement through a relatively large correction distance until the dressed grinding tool recovers a certain abrading capacity during the course of the grinding cycles; and thereafter repeatedly carrying out another grinding cycle during which the recovered grinding tool undergoes relative retracting movement through a relatively small correction distance.

4,713,915

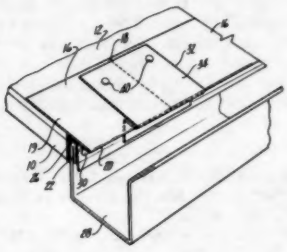
EDGE CLIP FOR AN EAVES TROUGH MOUNTING ADAPTER

Ronald L. Sweers, 6165 E. Atherton Rd., Burton, Mich. 48519

Continuation of Ser. No. 644,818, Aug. 27, 1984, abandoned. This application May 20, 1986, Ser. No. 867,899

Int. Cl.[4] E04D 13/06

U.S. Cl. 52—11 **3 Claims**



1. In combination:

an inward-to-outward downwardly sloping roof surface;

at least two eaves trough adapter strips of the type having: a roof flange adapted to flatly abut against and overlie said roof surface, said roof flange including an outer flange edge disposed outward of said roof surface; a drip flange extending slantingly upwardly from said outer flange edge parallel to and towards said roof surface; and a gutter-receiving portion extending downwardly from said drip flange;

a clip for securing said adapter strips on said roof surface in end-to-end abutment with one another, said clip comprising: a first inward-to-outward downwardly sloping flat portion adapted to flatly abut against and overlie the locus of abutment of the roof flanges of said two adapter strips, said first portion being disposed parallel to said roof surface, and including an outer clip edge outward of said roof surface; a second outward-to-inward upwardly sloping plate portion extending parallel to said roof surface and to said first flat portion and extending from said outer edge of said first flat portion and towards said roof surface, said second portion adapted to overlie and flatly abut against the locus of abutment of the drip flanges of said two adapter strips, and including an inner edge outward of said roof surface and inward of said outer clip edge; and a third flat portion extending downwardly from said inner edge of said second portion, said third portion adapted to overlie and flatly abut against the locus of abutment of said gutter-securing portions of said two adapter strips; and

means for securing said clip to said roof surface and said two adapter strips;

wherein said clip closely conforms in shape to the flange portions of said eaves trough adapter strips for both simultaneously aligning said abutted adapter strips and for sealing the locus of abutment of said adapter strips against leakage, and wherein the width of said clip is at most equal to the width of said roof flange along said downwardly sloping roof surface.

4,713,916

CEILING DOME

Raymond E. Brooks, Jr., Largo, Fla., assignor to Hardwood Lighting Designs Corp., Largo, Fla.

Filed Oct. 8, 1986, Ser. No. 924,950

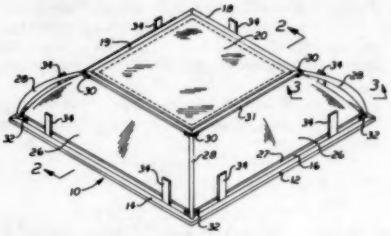
Int. Cl.[4] G09F 7/18

U.S. Cl. 52—39 **15 Claims**

1. A factory manufactured ceiling dome for diffusing light comprising:

a. a top frame having a planar shelf for receiving a top panel on an upper surface and a notch on a bottom surface of the planar shelf with a first slotted track in the notch;

b. a bottom frame having an outwardly projecting flange for overlapping a ceiling and an upwardly projecting lip with a notch in a top surface containing a second slotted track;



c. four arched linking members each having a bracket at a first and second end, the bracket at the first end attached to the top frame and the bracket at the second end attached to the bottom frame; and

d. light diffusing panels with an upper edge in the first slotted track and a lower edge in the second slotted track.

4,713,917

FRICTIONAL ENERGY ABSORBING DEVICE AND/OR METHODS OF ABSORBING ENERGY

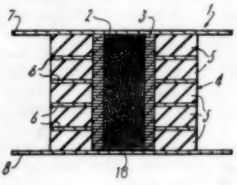
Ian G. Buckle, and John P. Michael, both of Auckland, New Zealand, assignors to DFC New Zealand Limited, Wellington, New Zealand

Continuation of Ser. No. 732,292, May 9, 1985, abandoned. This application Apr. 20, 1987, Ser. No. 38,482

Claims priority, application New Zealand, May 11, 1984, 208129

Int. Cl.[4] E04B 1/98

U.S. Cl. 52—167 **31 Claims**



1. A cyclic shear energy absorber adapted to be interposed between two members, the two members including either two structures or one structure and a base, for absorbing energy due to induced motion between the two members, comprising:

a body; a first end portion of said body engageable to one of the members, a second end portion of said body engageable to the other one of the members,

a core in said body containing granular material extending between said first and second end portions, and

said granular material being confined by said first and second end portions to occupy a substantially constant volume during deformation of said body due to relative movement of the two members, and having confining means disposed about said core in the region between said first and second portions whereby said granular material is densely packed within said core so that cyclic shear energy imposed on said body causes incipient dilation of said granular material, which incipient dilation is at least in part suppressed by said confining means whereby inter-

particle frictional forces within said granular material dissipate said imposed cyclic shear energy;

said substantially constant volume being deformed along with said core during deformation thereof while still maintaining its said substantially constant volume;

said confining means comprising alternating layers of resilient material and stiffener material;

said confining means having a flexible wall surface;

said flexible wall surface comprising a flat member generally spirally wound about the outer surface of said core, said flexible wall surface being formed by the individual winding layers;

at least some of said individual winding layers being separated from their adjacent layers by a layer of resilient material.

4,713,918

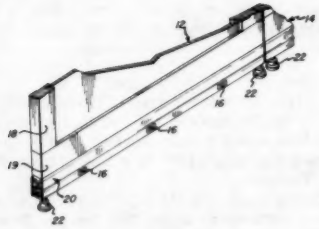
MODULAR WALL SYSTEM

Victor E. Cioffi, Mahwah, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Filed Jan. 30, 1986, Ser. No. 824,150

Int. Cl.[4] E04F *17/08, 19/08;* **H02G** *3/12, 3/16*

U.S. Cl. 52—221 **11 Claims**



1. A modular wall system comprising:

a wall panel;

an elongate base having a substantially uniform cross-section along its length, said base comprising an extruded unitary beam having a web extending from a top flange to a bottom flange, said beam being symmetric with respect to a central plane, said web being coincident with said central plane said beam having a mid-flange located between and spaced from said top and bottom flanges, said flanges extending in substantially parallel relation to each other and substantially perpendicular relation to said central plane, each said flange having two ends spaced substantially equal distance from said central plane, said flanges and said web defining on each side of said central plane a first duct between said top and mid-flange and a second duct between said mid-flagge and said bottom flange;

means for securing said wall panel to said top flange;

said top flange having a lower surface intersecting with said top flange ends to define two edges extending along the length of said beam, said mid-flange having upper and lower surfaces intersecting with said mid-flange ends to define four edges extending along the length of said beam, said bottom flange having an upper surface intersecting with said bottom flange ends to define two edges extending along the length of said beam;

for each said edge, said flange surfaces adjacent said edge sloping inwardly toward its respective flange to define a retaining protrusion, said beam including a stop lug for each said protrusion spaced a predetermined distance from said edge to define between each said protrusion and its respective lug a channel;

an elongate cover plate for each said duct to provide independent access to each of the four ducts in said base, each cover plate having an interior face, each said face having margin areas extending the length of the plate and abutting said flange ends, each said margin area having a rail extending into said channel between said retaining protrusion and said stop lug of the abutting flange; and

for each cover plate and its two associated flanges, said edges of said flanges being spaced a predetermined flange distance, each said cover plate rail protruding from its margin area and having a convex surface, said convex surface including a base adjacent the margin area, an apex, and a tip, said apexes being spaced a predetermined apex distance larger than said flange distance, said base and said tip of one rail being spaced from said base and said tip of said other rail distances less than said flange distance, thereby permitting insertion of said ..ps between said edges and forcing of said apexes into said channels to retain each said cover plate with respect to its flanges.

4,713,919

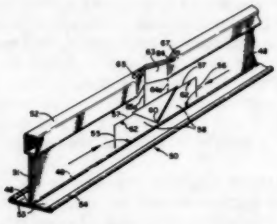
LASER WELDED CEILING GRID MEMBERS

William J. Platt, Collingdale, Pa., assignor to National Rolling Mills Inc., Malvern, Pa.

Filed Sep. 5, 1986, Ser. No. 904,024

Int. Cl.[4] E04C *3/32, 3/04;* **B23K** *9/00*

U.S. Cl. 52—232 **21 Claims**



11. A metal inverted T shaped ceiling grid member, comprising

a vertical central web having a bulb at the top and having two web sidewalls with upper and lower portions,

a pair of oppositely disposed horizontal flanges extending outwardly from the bottom of the web for supporting ceiling tiles,

and a laser weld joining the two web sidewalls together along the exposed longitudinal portion of the joint formed by the two web sidewalls after the grid member has been constructed to increase the strength and rigidity of the ceiling grid member.

4,713,920

MODULAR TONGUE AND GROOVE REMOVABLE PANEL PARTITION SYSTEM

Stanley Oginz, Pink Dogwood Farm, Hadensville, Va. 23067

Filed Jun. 23, 1986, Ser. No. 877,235

Int. Cl.[4] E04B *2/74*

U.S. Cl. 52—582 **5 Claims**

1. A modular panel unit comprising:

first and second plates having the planes of their surfaces in parallel orientation to one another;

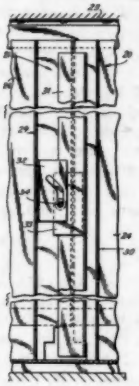
first and second vertically oriented U-shaped channel brackets perpendicularly affixed to the inner surfaces of the plates at their respective outer edges;

a vertically oriented U-shaped tongue of narrower width than the channel brackets so as to freely move within the channel brackets;

a plurality of tongue retraction brackets each having a slotted opening, affixed to the inside of the channel bracket in one edge of a panel unit at specified positions;

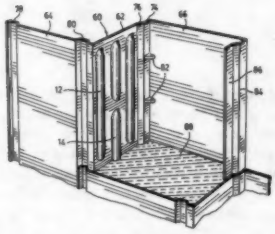
a plurality of other tongue retraction brackets, attached to the tongue at specified positions corresponding to the

positions of the slotted tongue retraction brackets and having connecting means mounted thereon such that the



connecting means cooperate with the slotted openings in the slotted tongue retraction brackets.

4,713,921
STUD FOR WALLS
Gerrard O. Minialoff, and Martin J. Minialoff, both of P.O. Box 107, R.R. #1, Kleinburg, Ontario, Canada L0J 1C0
Filed Jun. 3, 1986, Ser. No. 870,057
The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.
Int. Cl.[4] E04C *1/10*
U.S. Cl. 52—579 **10 Claims**



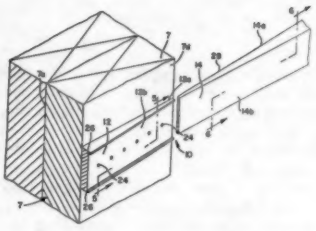
1. A panel formed from a single sheet of metal and comprising:

an exterior panel portion, which is generally planar and includes a first coupling channel, which has a shallow, trapezoidal cross-section and extends adjacent a free edge of the exterior panel portion, and a second coupling channel, which has a shallow trapezoidal cross-section and which extends adjacent an opposite edge of the exterior panel portion, for engaging a first coupling channel of another panel, each of the trapezoidal cross-sections including inwardly inclined sides and a central planar portion parallel to the exterior panel portion;

an interior panel portion, adapted to be overlied by an exterior panel portion, which interior panel portion is generally planar; and

a stud extending between the interior and exterior panel portions and including a plurality of rows of slits extending along the length of the stud with parts adjacent each slit being displaced relative to one another, with adjacent rows being spaced from one another and with the slits of adjacent rows staggered so that a bridging portion between two slits of one row is adjacent a slit of an adjacent row so as to reduce thermal conductivity between the interior and exterior panel portions.

4,713,922
FRAME MOUNTING STRUCTURE FOR A HOUSING OPENING AND METHOD THEREFORE
John P. Ingold, 2590 Beaumont, Green Bay, Wis. 54301
Filed Sep. 10, 1986, Ser. No. 905,861
Int. Cl.[4] E04C *2/38*
U.S. Cl. 52—656 **19 Claims**



1. Wedge shim means for attaching building opening jamb framework to a building studding surface for plumbing the framework having sides for hanging a closure member on the framework sides in plumb relationship therewith, said shim means comprising:

a pair of tapered shims each having a sloped surface lying against other with the slope surface of one shim going in the opposite direction of the other,

one of said pair of shims having an outer generally flat surface generally parallel to the outer flat surface of the other shim and each shim flat surface being angulated with respect to its respective slope surface, said one shim having its flat surface being adapted to be affixed to the studding surface,

each shim having top and bottom edge portions and complemental intercoupling and interlocking means on both the top and bottom edge portions for interlocking the one shim to the other shim whereby the other shim is movably supported on the one shim with the sloped surface of each shim movably engaging and facing the other,

said other shim being movable mounted on said one shim for varying the width of the shim means and having its flat surface facing for engagement with the framework,

said shim means being adjustable to provide for adjustment of the position of one shim with respect to the other along their slope surfaces to determine the thickness of the wedge means to accommodate the spacing between the stud surface of the studding and the jamb surface of the framework to provide for plumbing of the framework on the building studding; and

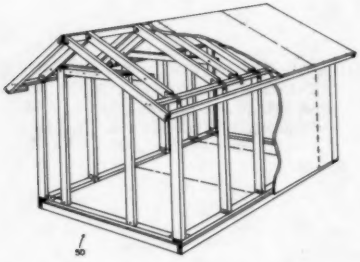
the shims being adapted to be fastened together in immobilized manner to one another after the other movable shim has been placed lengthwise of each other within said one shim to provide the desired shim thickness and for fastening the shims to the studding and the framework to the shims.

4,713,923

METHOD AND MEANS FOR BUILDING A PITCHED ROOF BUILDING USING ONLY SQUARE-END FRAMING MEMBERS

Ulrich Sielaff, and David O. Hamel, both of Madison, Wis., assignors to United Steel Products Company, Montgomery, Minn.

Filed May 13, 1985, Ser. No. 733,085
Int. Cl.[4] E04B *1/48, 7/06*
U.S. Cl. 52—713 **14 Claims**



1. Apparatus for enabling square-end roof rafters to be used in framing and erecting a pitched roof on a building by an individual working unassisted in which said building includes a roof ridge member, at least one building sidewall having upper and lower stud wall plates and a plurality of square end rafters, said apparatus comprising:

(a) a plurality of symmetrically configured roof-ridge-to-rafter-end connectors each configured with a pair of channel shaped terminal portions consisting of a generally rectilinear channel back and a pair of spaced channel sides being perpendicular to and integrally connected with said channel back and parallel to one another for receiving rafter end extremities, said channel shaped terminal portions being integrally connected in separated channel-back to channel-back juxtaposition by a central planar portion disposed mutually perpendicular to said channel sides and channel backs of said channel shaped terminal portions and forming with said channel backs of said channel shaped terminal portions a channel configured pocket for receiving a lower portion of a roof ridge member extending transversely to said rafters wherein said central planar portion comprises the back of said channel configured pocket and said channel backs of said channel shaped terminal portions comprise the sides of said channel configured pocket, said channel sides of said channel shaped terminal portions being further configured to receive a bolt through each facing pair thereof, and wherein each of said channel backs comprises a substantially rectilinear planar portion having a pair of side edges integrally connected with said pair of channel sides, a bottom edge integrally connected with said central planar portion and a free edge opposite said bottom edge and said adjacent to each of said side edges which is free of connection with any further structure and

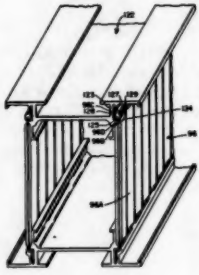
(b) a plurality of rafter-end-to-stud-wall-plate connectors each configured with a substantially rectilinear central planar portion having four edges defining the end extremities of said central planar portion, said four edges including a first pair of edges disposed on opposite sides of said central planar portion and lying generally parallel to one another and a second pair of edges disposed on opposite sides of said central planar portion, lying generally parallel to one another between the end extremities of said first pair of edges and being generally perpendicular to said first pair of edges, a first pair and a second pair of spaced parallel facing planar portions extending from said first and second pair of edges, respectively said first planar portion pair being disposed perpendicular to said central planar portion, said second planar portion pair being disposed mutually perpendicular to both said central planar portion and said first planar portion pair and projecting from said central portion in a direction opposite that of said first planar portion pair, said second planar portion pair configured to extend beyond an end extremity of said central planar portion defined by one of said first pair of edges for receiving the end of a rafter in the spacing between parallel planar portions thereof, said roof-ridge-to-rafter-end connectors and said rafter-end-to-stud-wall-plate connectors, when used in complementary fashion with one each attached to opposite end extremities of a rafter enabling an individual working alone to erect a pitched roof frame on a building using only squared-end rafters.

4,713,924

STRUCTURAL BEAM AND PANEL SYSTEMS AND METHODS AND APPARATUS FOR MAKING THE SAME

Andrew J. Toti, 311 W. River Rd., Modesto, Calif. 95351

Division of Ser. No. 396,609, Jul. 9, 1982, Pat. No. 4,526,024.
This application Jun. 28, 1985, Ser. No. 750,413
Int. Cl.[4] E04C *3/30*
U.S. Cl. 52—731 **7 Claims**



1. An elongated sheet metal panel formed by rotating die comprising a first portion including a major central portion having transverse corrugations formed therein to a depth of at least about 0.100 inch, a transition step portion adjacent said first portion having transverse serrations, and at least one marginal edge portion which is either uncorrugated or has longitudinal corrugation or relatively light transverse corrugations therein, said transition portion and said edge portion having substantially the same overall length as said corrugated first portion so that said panel is substantially straight.

4,713,925

METHOD AND APPARATUS FOR FILLING A PLURALITY OF FLEXIBLE PIPETTE TYPE VESSELS

N. H. Kafkis, 8537 Skokie Blvd., Skokie, Ill. 60077

Continuation-in-part of Ser. No. 718,489, Apr. 1, 1985, abandoned. This application Jun. 11, 1986, Ser. No. 872,819
Int. Cl.[4] B65B *31/02*
U.S. Cl. 53—432 **19 Claims**

1. A method of filling a plurality of vessels, comprising:

providing a plurality of vessels having filling ports therein, said vessels having a body at one end and an elongated filling and discharge tube extending therefrom with said port at the end of said tube;

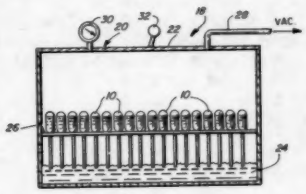
sorting said tubes to align said bodies and said tubes;

providing a loading or filling rack with a slot in one side thereof;

loading said tubes into said loading rack with said tubes extending through said slot;

providing a container for filling said vessels;

filling at least a portion of said container with a liquid with which to fill said vessels;
inserting said rack with said vessels into said container with said filling ports submerged in said liquid;
sealing and evacuating said container to a desired negative pressure to evacuate said vessels;
releasing said pressure to fill said vessels with said liquid;
removing said rack with said filled vessels therein;



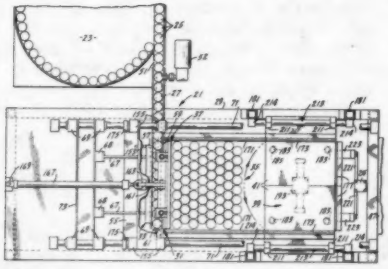
providing a sealing mechanism;
inserting said tubes in said rack into said sealing mechanism and sealing said tubes; and
providing a labeling mechanism and providing a vessel loading mechanism for said rack and said vessels and unloading said sealed vessels from said rack into said loading mechanism and labeling said vessels after discharging said vessels from said loading mechanism.

4,713,926

PACKAGING MACHINE AND METHOD

John Mennie, Granville; Donald L. Troglio, and Larry E. Zielinski, both of Mark, all of Ill., assignors to Wheeling Stamping Company, Wheeling, W. Va.

Filed Jun. 26, 1986, Ser. No. 878,634
Int. Cl.[4] B65B *35/30*
U.S. Cl. 53—443 **8 Claims**



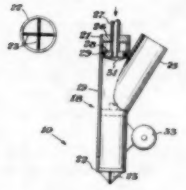
1. A machine for density packing of cylindrical plastic objects in layers in containers of rectangular, horizontal cross-section, including:
an elongated table,
a vertical transfer mechanism for the plastic objects located at one end of the table,
means to load the cylindrical plastic objects onto the table at the end of the table opposite to the vertical transfer mechanism end to form a row of cylindrical plastic objects on the table extending across the width thereof with the plastic objects in the row in close contact,
said means to load the cylindrical plastic objects onto the table including a belt conveyor extending across the width of the table, a feeder supplying cylindrical plastic objects in a row to the belt conveyor and a stop at the end of the belt conveyor away from the feeder to limit the number of cylindrical plastic objects in the row, the location of the stop relative to the belt conveyor being adjustable to vary the number and position of the cylindrical plastic objects in the row being formed so that the cylindrical plastic objects in one row are staggered relative to the cylindrical plastic objects in an adjacent row,
means to move each individual row of cylindrical plastic objects along the table towards the vertical transfer mechanism after the row is formed to thereby assemble a predetermined number of rows of cylindrical plastic objects into a matrix of plastic objects with the plastic objects in the matrix in close contact,
means to move the assembled matrix of cylindrical plastic objects to a position under the veretical transfer mechanism,
a lifting mechanism formed as part of the vertical transfer mechanism, and
means to operate the lifting mechanism to sequentially:
lift all of the plastic objects of the matrix from the table;
lower the matrix of plastic objects to a selected vertical position below the table and release them in unison to form a layer of plastic objects in the container; and
raise the lifting mechanism to a position above the table to await the next assembled matrix of plastic objects being loaded on the table a row at a time.

4,713,927

PROCESS AND APPARATUS FOR PACKAGING

Louis C. Rubens, and Willard E. Alexander, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 15, 1986, Ser. No. 863,625
Int. Cl.[4] B29D *27/04*
U.S. Cl. 53—472 **10 Claims**



1. A process of packaging an article within a paper board container the steps of the method comprising providing a paper board container having sufficient dunnage wherein to position the article in a generally desired location within the paper board container, closing the paper board container, slitting a portion of the top of the paper board container, injecting into the paper board container through the slit portion under superatmospheric pressure a sufficient quantity of partially collapsed foamed synthetic resinous particles, reducing the pressure within the paper board container to atmospheric pressure and thereby causing partially collapsed particles to expand and contact adjacent particles, the article and paper board container walls and thereby form a plurality of deformed particles maintaining the article in a desired relationship to the paper board container walls.

4,713,928

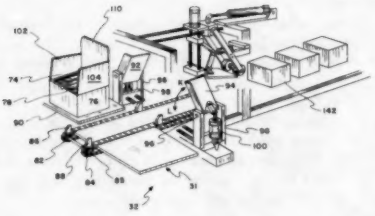
AUTOMATIC PACKAGING MACHINE FOR CLOSING OVER FILLED BOXES

Steven Tisma, Chicago, Ill., assignor to Tisma Machine Corporation, Chicago, Ill.

Filed Sep. 9, 1986, Ser. No. 905,705
Int. Cl.[4] B65B *35/38, 61/24*
U.S. Cl. 53—526 **10 Claims**

1. An automatic packaging machine comprising a loading station means for simultaneously and sequentially picking up a plurality of elongated products and depositing them in a spaced parallel alignment within a box, when picked up each of said products having an initial volume which is substantially greater than the volume which the same product will have after it has settled over time within said box, whereby said box

needs to be overfilled at said loading station so that it will be full after said products have settled, said box having a pair of opposed end flaps which are large enough to at least jointly cover the space through which said products are inserted into the box, means for advancing said over filled box to a closing station, means for thereafter closing a lid of said box without damage to said over filled products, immediately reducing the volume of said products to the volume which they would have after said products have settled, said closing means comprising



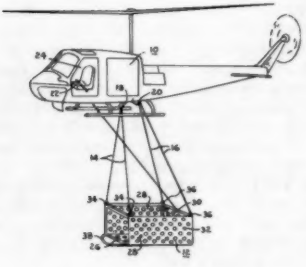
a pair of pivoted paddle-like members which swing over and close said end flaps to press said overfilled products into said box, means for thereafter folding a top flap over said box and tucking an end of said top flap therein, each of said paddle-like members having a generally L-shaped cross section with a small end of said L-shape projecting upwardly toward said end of said top flap, and means for folding an end of said top flap over said small end of said L-shape in order to form said end of said top flap into a tuck flap.

4,713,929

HARVESTING OF AQUATIC VEGETATION BY HELICOPTERS

Robert W. Smith, Alva, Fla., assignor to Colony Services Inc., LaBelle, Fla.

Filed Mar. 9, 1987, Ser. No. 23,713
Int. Cl.[4] A01D *44/00*
U.S. Cl. 56—8 **6 Claims**



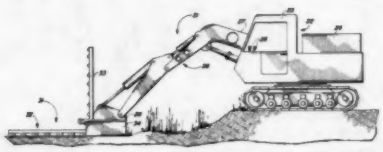
1. The method of harvesting aquatic vegetation by helicopter which comprises the steps of: (1) providing a container having an open front and bottom, sides and back walls, a series of apertures in the walls to permit the escape of water; (2) suspending the container beneath a helicopter; (3) providing controls to vary the angular relation of the container between a position where the bottom of the container is substantially horizontal in a loading position and a forwardly tilted angular position to an unloading position to permit gravity to dischage the harvested aquatic vegetation from the container; (4) flying the helicopter over a patch of aquatic vegetation with the bottom of the container in a substantially horizontal position submerged to a desired depth to harvest the aquatic vegetation and with the open front of the bucket in alignment with aquatic vegetation to induce the vegetation to flow into the container and to be compacted therein by the forward speed of the helicopter; (5) increasing the elevation of the container to withdraw the container from the water; (6) flying the helicopter to an aquatic vegetation unloading area; and (7) tilting the container angularly forwardly to the unloading position to permit gravity to unload the container.

4,713,930

MOBILE BRUSH CUTTER

Peter E. Whiting, 281 Brook Street, Framingham, Mass. 01701

Filed May 13, 1986, Ser. No. 862,873
Int. Cl.[4] A01D *55/00*
U.S. Cl. 56—10.8 **20 Claims**



1. A mobile brush cutter comprising:

a vehicle;

a boom having one end pivotally supported by said vehicle;

hydraulic power system means mounted on said vehicle and having controls operable by an operator thereof;

a cutter supported by an opposite end of said boom and operatively coupled to said hydraulic power system; said cutter comprising an elongated bed knife having a face and one end connected to said opposite end of said boom and having bed teeth that define longitudinally spaced apart slots in said face for receiving stalks and a moving knife juxtaposed face to face to said bed knife and mounted for longitudinal reciprocating movement relative to said bed knife, said moving knife having moving teeth that define a plurality of cutting edges each shaped and arranged to reciprocate through a cutting zone transversely adjacent to a different one of said slots; and

retainer means fixed to said bed knife and shaped and arranged for sliding engagement with outer end portions of said moving teeth so as to prevent transverse separation thereof from said bed knife.

4,713,931

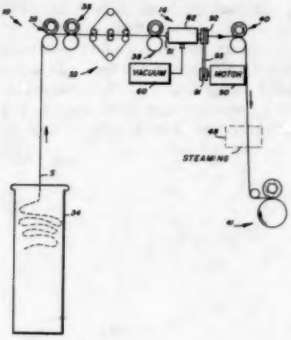
APPARATUS FOR VACUUM SPINNING

Elbert F. Morrison, Clarksville, Va.; Danny R. Bradley, Bullock, and D. C. Reece, Oxford, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Continuation-in-part of Ser. No. 386,078, Jun. 7, 1982, Pat. No. 4,507,913. This application Dec. 3, 1984, Ser. No. 677,487
Int. Cl.[4] D01H *5/28, 1/12;* **D02G** *1/06*
U.S. Cl. 57—328 **38 Claims**

1. Apparatus for forming yarn comprising: an elongated hollow shaft having a first end and a second end, a through-extending passageway from the first end to the second end, at least a portion of the entire circumference of the shaft being perforated; means for mounting said shaft for rotation about an axis; means for rotating said shaft about its axis; means for passing textile fibers through the through-extending passageway of said shaft linearly, generally along the axis of rotation thereof, the fibers being fed into the first end thereof; means for applying a vacuum to the exterior of said shaft so that at least some of the fibers or free ends of fibers passing through said shaft will draw toward the shaft perforations, and will be caused to rotate with said shaft as the remaining fibers are maintained generally parallel an move generally linearly along

the axis of rotation; means for withdrawing formed yarn from the second end of said shaft, opposite said first end thereof; and



wherein the perforations in said portion of said hollow shaft comprise perforations that slant in the direction of said second end from the through-extending passageway.

4,713,932

SUPPORTING DISK FOR A SUPPORTING-DISK BEARING OF AN OPEN-END SPINNING MACHINE

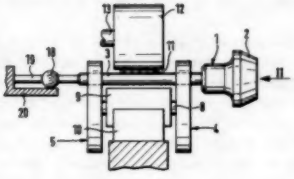
Werner Zott, Donzdorf, Fed. Rep. of Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany

Filed Apr. 14, 1987, Ser. No. 38,139

Claims priority, application Fed. Rep. of Germany, May 10, 1986, 3615777

Int. Cl.[4] D01H 7/882, 1/241

U.S. Cl. 57—406 15 Claims



1. A supporting disk for a supporting-disk bearing for a shaft of an open-end spinning rotor, comprising:

a disk-shaped basic body made of rigid material and provided with a centric bore for receiving a shaft; and

a ring circumferentially surrounding and fitted to the basic body, said ring, forming a smooth uninterrupted, essentially cylindrical running outer surface for supporting a rotor shaft, said ring being formed of ring material other than the material of the basic body and serving to provide damping support to a rotor shaft.

wherein an inner surface of the ring has a profiling by means of which the thickness of the ring in its central area is reduced with respect to its edge areas.

4,713,933

HELICOPTER WITH A TURBINE POWER UNIT FITTED WITH AN EXHAUST SCREENING DEVICE

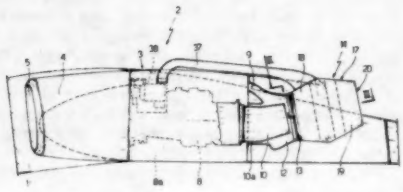
Gianluigi Bandera, Gallarate, Italy, assignor to Costruzioni Aeronautiche Giovanni Agusta S.p.A., Italy

Filed May 28, 1986, Ser. No. 867,792

Claims priority, application Italy, Jun. 7, 1985, 67530 A/85

Int. Cl.[4] F02C 7/12

U.S. Cl. 60—39.5 5 Claims



1. A helicopter comprising a turbine power unit, an exhaust screening device, and at least a first cooling duct for externally conveying air cooling interal parts on the helicopter, the said power unit comprising an engine compartment, a second duct for cooling the said engine compartment, a turbine engine housed inside the said compartment, a dynamic outside-air intake, an engine intake duct and a bypass duct, both connected to the said dynamic intake, and an engine exhaust nozzle; characterized by the fact that it comprises a manifold (12); an input of said manifold (12) being connected to an output of said nozzle (10), said bypass duct (9), and said cooling ducts (10*a*, 15) to receive therefrom respective fluid flows to form a fluid mixture; an output of said manifold (12) being connected to an input of said screening device (14) to feed the same with said mixture; and said screening device (14) comprising a number of ejectors (27, 28, 39, 30) which are located so as to activate the fluid flows through said bypass and cooling ducts (9, 10*a*, 15), and through each of which a part of said fluid mixture flows.

4,713,934

GAS TURBINE ENGINE AIR INTAKE

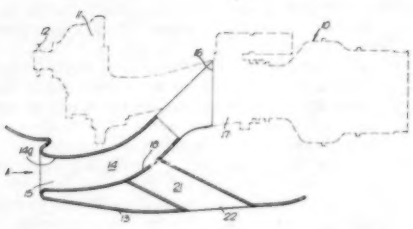
Terence R. Pellow, Watford, United Kingdom, assignor to Rolls-Royce plc, London, England

Filed Nov. 2, 1982, Ser. No. 438,636

Claims priority, application United Kingdom, Nov. 21, 1981, 8135122

Int. Cl.[4] F02G 3/00

U.S. Cl. 60—39.092 3 Claims



1. An air intake for a compressor of a gas turbine engine comprising:

a primary duct defined by an annular wall, said primary duct having an air inlet for receiving air and an air outlet arranged to deliver air therefrom to the compressor of the gas turbine engine, said primary duct being at least partially arcuate in cross-sectional form whereby said air outlet is offset laterally from said air inlet and air flowing

through said duct follows a tortuous path, a portion of said annular wall of said primary duct being frangible and being arranged to be impacted by any foreign body above a predetermined weight ingested through said air inlet, said frangible portion of said annular wall being formed by a sheet of light alloy having lines of weakness extending about and defining a periphery of the portion of said annular wall, said lines of weakness being defined by regions of reduced thickness in said sheet, and further lines of weakness in said sheet defined by regions of reduced thickness in said sheet, said further lines of weakness extending in said sheet from said lines of weakness defining the periphery of said portion and terminating together, said further lines of weakness being thinner than said lines of weakness defining said periphery of said portion whereby when said sheet is penetrated by a foreign body, said sheet divides along said further lines of weakness to define a plurality of flaps hinged to said wall by said lines of weakness extending about the periphery of said portion; and

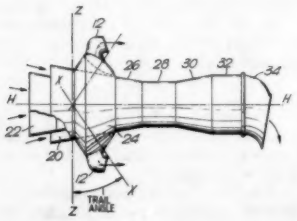
a secondary duct extending from said primary duct, said portion of said wall defining a barrier between said primary duct and said secondary duct, said secondary duct being arranged to receive said foreign body when said portion is penetrated.

4,713,935

VECTORABLE NOZZLES FOR AIRCRAFT

Gary F. Szuminski, Marietta, and Douglas J. Nightingale, Jonesboro, both of Ga., assignors to Rolls-Royce Inc., New York, N.Y.

Filed Apr. 8, 1986, Ser. No. 849,492
Int. Cl.[4] F02K *1/00*
U.S. Cl. 60—229 **13 Claims**



1. A gas turbine engine for installation in an aircraft fuselage which includes a storage cavity, the engine comprising:

a compressor means;

a first vectorable nozzle having an exit area and being positioned to receive air compressed by the compressor means;

a valve means which in a first position interrupts the flow of compressed air from the compressor means and thereby renders the nozzle inoperable, and in a second position allows air from the compressor means to flow to the nozzle and thereby render the nozzle operable;

combustion means connected for receiving air from the compressor means;

turbine means positioned to receive gases from the combustion means and connected to drive the compressor means;

and a second vectorable nozzle positioned to receive and direct gases from the turbine means;

means for mounting said first nozzle for rotation about an axis which is angled relative to a first plane which is perpendicular to the longitudinal centerline of said engine and having said exit area offset from said axis of rotation;

means for rotating said mounting means to move said nozzle between a stowed position within said cavity wherein said valve means is in said first position and an operating position outside said cavity wherein said valve means is in said second position;

said engine further including a fairing means provided to cover the fuselage cavity in both the deployed and the stowed positions of said first nozzle;

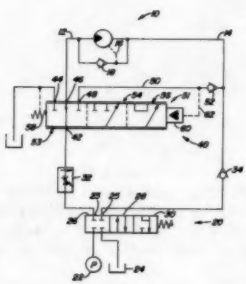
said fairing means comprising a first portion fixed relative to the nozzle which acts to fair the forward end of the cavity when the nozzle is in the fully deployed or stowed position, and a movable second portion which acts to fair the rear portion of the cavity in both the deployed and stowed positions of the first nozzle.

4,713,936

MOTOR SEAL PROTECTOR VALVE

Dennis R. Barber, Waterloo; Larry M. Delfs, Cedar Falls, and Ronnie F. Burk, Waterloo, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Nov. 18, 1985, Ser. No. 799,057
Int. Cl.[4] F15B *13/042*; F16K *21/04*
U.S. Cl. 60—403 **3 Claims**



1. In a hydraulic system including a source of system pressure, a source of reservoir pressure, and a hydraulic motor having an inlet for receiving system pressure and having an outlet communicated with reservoir pressure, characterized by:

pressure-responsive valve means for blocking communication of system pressure with the motor inlet and for communicating the motor inlet with reservoir pressure in response to an overpressure condition at the motor outlet, the valve means comprising a valve having a valve bore therein, an inlet connecting the valve bore to a system pressure, a first outlet communicating the valve bore with reservoir pressure, a second outlet communicating the valve bore with the motor inlet, a third outlet communicating the valve bore with the motor outlet via a return passage, a valve member movable in the bore to a first position wherein the inlet is connected to the second outlet and the first and third outlets are blocked, to a second position wherein the first and second outlets are blocked and wherein the inlet is connected to the third outlet and to a third position wherein the first and second outlets are connected to each other and wherein the inlet is connected to the third outlet, a spring biased to urge the valve member to the first position, a pressure-operated pilot for moving the valve member to the second and third positions and a pilot line communicating the pilot with the return pressure.

4,713,937

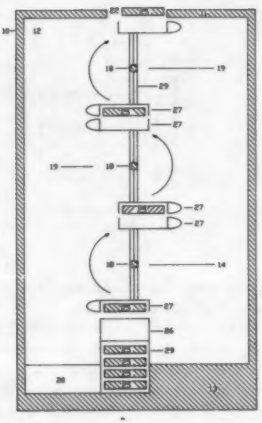
MULTIPLE DRIVE BUOYANCY ENGINE

Dennis A. De Shon, 7242 Seven Oaks Ave., Baton Rouge, La. 70821

Continuation-in-part of Ser. No. 771,363, Aug. 30, 1985, abandoned. This application Apr. 21, 1986, Ser. No. 854,048

Int. Cl.[4] F03B 17/02

U.S. Cl. 60—495 1 Claim



1. A multiple drive buoyancy engine, comprising:

a plurality of vertically stacked drive units disposed in a vessel containing mercury;

drive units having axial drive shafts extending outwardly thereof and supported by sealed bearings in the vessel walls;

drive units incorporating electromagnetic capture modules, designed to receive capsules, and which are positioned at the extreme ends of hydrodynamically designed arms;

said capture modules designed to hold capsules through their lift cycle, and to release capsules, at the top of the lift cycle, into the lowermost capture module of the next subsequent drive unit;

said capsules having rigid walls, and containing air;

a rotational-speed programmed, computer controlled air-lock, pressurized by an air compressor, which injects capsules into the lowermost capture modules as they are rotated into alignment;

meshing gears on each of the protruding drive shaft axles, which ensure rotational alignment and sequencing of the capture modules to receive capsules.

4,713,938

GAS TURBINE ENGINE GASEOUS FUEL INJECTOR

Jeffrey D. Willis, Coventry, United Kingdom, assignor to Rolls-Royce plc, London, United Kingdom

Filed Apr. 29, 1986, Ser. No. 856,987

Claims priority, application United Kingdom, Jun. 7, 1985, 8514478

Int. Cl.[4] F02C 1/00

U.S. Cl. 60—742 3 Claims

1. A gas turbine fuel injector comprising:

an outer gaseous fuel duct having a downstream end;

a central gaseous fuel duct coaxially positioned within said outer fuel duct and having a downstream end projecting therefrom;

said outer gaseous fuel duct and said central gaseous fuel duct comprising a pair of pipes, one located within the other, and having at one end a flange attachment for the securing of the assembly to the engine casing, the injector terminating at the other end in a pair of outlets, each having an axis, means for supplying natural gas fuel to said central gaseous fuel duct and means for supplying gaseous fuel from a coal gasifier to said outer gaseous fuel duct;

an outer ring;

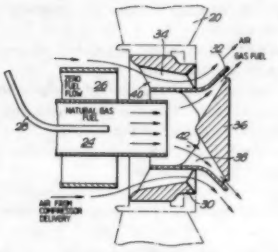
a plurality of swirl vanes extending inwardly from said outer ring;

a central duct member supported from said outer ring by said swirl vanes, said central duct having an upstream end and a downstream end;

a plurality of further swirl vanes extending inwardly from said central duct member;

a pintle supported from said central duct member by said further swirl vanes;

said outer ring, central duct member and pintle defining



between them an outer annular flow passage and an inner annular flow passage, said outer annular flow passage and said inner annular flow passage each decreasing in cross-sectional area in a direction of flow therethrough;

said central gaseous fuel duct having the downstream end thereof extending into said central duct member for directing gaseous fuel therefrom into said inner annular flow passage; and

said outer gaseous fuel duct having

means for spacing said downstream end thereof a distance from said inner and outer flow passages and said upstream end of said central duct member to direct gaseous fuel into both said inner annular flow passage and said outer annular flow passage.

4,713,939

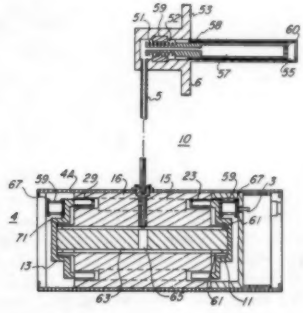
LINEAR DRIVE MOTOR WITH SYMMETRIC MAGNETIC FIELDS FOR A COOLING SYSTEM

William C. Keith, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 23, 1986, Ser. No. 867,850

Int. Cl.[4] F25B 9/00; H01L 25/00

U.S. Cl. 62—6 6 Claims



1. A cooling system comprising:

a combination of a compressor and dual armature linear induction motor including a stator having a generally

cylindrical shape, a first end and a second end and a first magnetic means centrally located between the first end and second end within the body of the stator, the magnetic means provides a first and second magnetic fields;

a first armature shaped to operatively fit on the first end of the stator and including a second magnetic means for providing a third magnetic field;

a second armature shaped to fit on the second end of the stator and having a third magnetic means for providing a fourth magnetic field;

a conduit through the center of the stator and extending outward for conducting a coolant between the combination of a compressor and dual armature linear induction motor and an expander;

a first piston connected to the first armature and extending into the stator;

a second piston connected to the second armature and also extending into the stator;

the first and second pistons operatively mounted in the stator to compress and expand a predefined volume located at conduit at the center of the stator;

the expander being operatively connected to the conduit for receipt of the coolant; and

a power supply for providing current to the combination of a compressor and dual armature linear induction motor to cause the first and second pistons to alternately compress and expand the predefined volume in response to the provided current.

4,713,940

PROCESS FOR OBTAINING C_{2+} OR C_{3+} HYDROCARBONS FROM GASEOUS MIXTURES

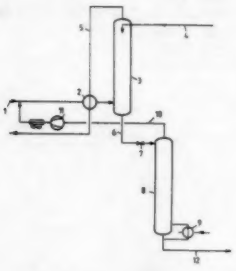
Gerhard Ranke, Poecking, and Friedrich Siegert, Wolfratshausen, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Nov. 7, 1986, Ser. No. 927,986

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1985, 3539554

Int. Cl.⁴ F25J *3/00*

U.S. Cl. 62—17 **13 Claims**



1. A process for obtaining C_{2+} or C_{3+} hydrocarbons from gaseous mixtures that contain hydrocarbons and dissolved inert gases comprising: scrubbing the gaseous mixture with a physical liquid solvent selective for C_{2+} or C_{3+} hydrocarbons; expanding the enriched liquid solvent to an intermediate pressure below its critical pressure; stripping the expanded enriched liquid solvent by heating and partial evaporation to remove said dissolved inert gases; and subsequently regenerating the solvent.

4,713,941

CRYOGENIC VESSEL

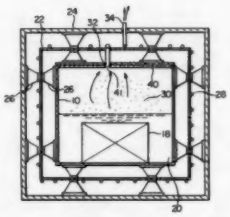
Katsuyoshi Toyoda, and Takashi Murai, both of Kobe, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 26, 1986, Ser. No. 934,992

Claims priority, application Japan, Nov. 28, 1985, 60-266154; Nov. 28, 1985, 60-266155; Nov. 28, 1985, 60-266156

Int. Cl.⁴ F17C *7/02*

U.S. Cl. 62—50 **5 Claims**



1. A cryogenic vessel for maintaining an electrical apparatus at a cryogenic temperature, comprising:

a cryogen tank including a substantially flat top wall and containing therein the electrical apparatus and a cryogen for cooling said electrical apparatus;

a radiation shield, enclosing said cryogen tank, for thermally shielding said cryogen tank against heat radiation from the outside;

an outer housing enclosing therein said radiation shield;

thermally insulating support means for supporting said cryogen tank and said radiation shield in a thermally insulating relationship;

a cooling tube for passing evaporated cryogen in said cryogen tank on said radiation shield for substantially uniformly cooling said radiation shield, said cooling tube having its inlet in the of said outer housing; and

cooling means disposed on the top wall of said cryogen tank for substantially uniformly cooling the top wall of said cryogen tank.

4,713,942

METHOD FOR COOLING AN OBJECT WITH THE AID OF SUPERFLUID HELIUM (HE II) AND APPARATUS FOR IMPLEMENTING THE METHOD

Albert Hofmann, Karlsruhe, Fed. Rep. of Germany, assignor to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Aug. 15, 1986, Ser. No. 900,912

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529391

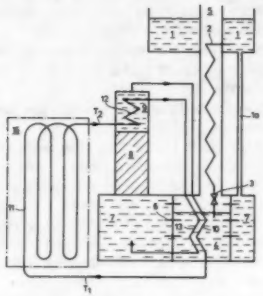
Int. Cl.⁴ F25D *25/00*

U.S. Cl. 62—62 **11 Claims**

1. A method of cooling a substrate, comprising steps for:

(a) cooling a substrate by contact with superfluid helium (He II) at a temperature betwen about 1.7° K. and 2.1° K. with a forced flow of He II to remove heat from the substrate and convert said Helium II to Helium I, and

(b) utilizing thermal power obtained from the heat being removed from the substrate to force a current of super-



fluid helium (He II) through the substrate by means of a fountain effect pump.

4,713,943

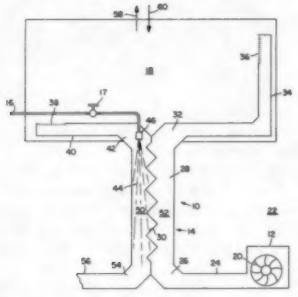
EVAPORATIVE COOLER INCLUDING AN AIR-TO-AIR COUNTER-FLOW HEAT EXCHANGER HAVING A REVERSE TEMPERATURE PROFILE

Christopher E. Wainwright, 1246 W. Kiowa Cir., Mesa, Ariz. 85202

Continuation-in-part of Ser. No. 550,711, Nov. 9, 1983, abandoned, which is a continuation of Ser. No. 305,397, Sep. 25, 1981, abandoned. This application Sep. 20, 1985, Ser. No. 778,412

Int. Cl.⁴ F28D *5/00*

U.S. Cl. 62—304 **22 Claims**



1. A method of cooling an enclosed space comprising the steps of:

supplying ambient air from the atmosphere;

cooling the ambient air at a constant humidity in an air-to-air counter-flow heat exchanger configuration;

directing the cooled supply air from the heat exchanger to the enclosed space to be cooled;

withdrawing return air from the enclosed space;

adding moisture to the return air evaporating the moisture in a reverse temperature profile; and

simultaneously heating the return air with the heat extracted from the supply air in the heat exchanger while increasing the specific humidity of the return air by increasing its ability to absorb the evaporated liquid, thereby enabling an even greater reduction in the temperature of the supply air by increased heat exchange between the supply air and the return air exhausting the relatively warm, humid return air to the atmosphere.

4,713,944

INTERMITTENTLY OPERATING SORPTION APPARATUS WITH SOLID SORBENT FOR HEAT AND COLD STORAGE

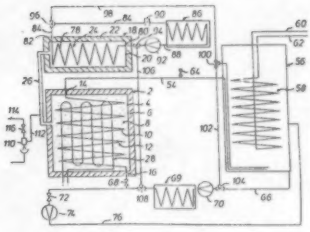
Gerhard Januschkowetz, Munich, Fed. Rep. of Germany, assignor to Schiedel GmbH & Co., Munich, Fed. Rep. of Germany

Filed Sep. 8, 1986, Ser. No. 904,649

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1985, 3532093

Int. Cl.⁴ F25B *17/08*

U.S. Cl. 62—480 **32 Claims**



1. An intermittently operating sorption apparatus for heat and cold storage comprising

a thermally insulated storage vessel comprising

a gas-tight housing and a mass of solid sorption agent contained therein,

a heating means capable of heating the solid sorption agent, and

a first heat-exchange means comprising a first pressure-resistant conduit;

a second heat-exchange means defining at least one of a thermally insulated evaporator and a condenser, said heat-exchange means comprising a second pressure-resistant conduit;

means for placing said first and second conduits in flow communication with one another;

separate in- and out-flow control devices operatively connected to said second conduit;

a mass of working medium of a substance capable of being in the liquid state; and

connecting means defining pressure-resistant and poorly heat-conducting connections for conducting the working medium between said storage vessel and said second heat-exchange means.

4,713,945

TURRET FOR CRYOSTAT

Michael L. Rappaport, Ramat Hasharon, and Leif Blumenau, Beersheva, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed Jul. 15, 1986, Ser. No. 885,649

Claims priority, application Israel, Jul. 30, 1985, 75968

Int. Cl.⁴ F25B *19/00*

U.S. Cl. 62—514 R **15 Claims**

1. A turret arrangement in a cryostat used in magnetic resonance (MR) systems, said turret arrangement providing access to the interior of a vacuum vessel integral to the cryostat; said cryostat comprising:

(a) said vacuum vessel shaped in the form of a horizontal cylinder having a bore extending therethrough along the longitudinal axis of said cylinder;

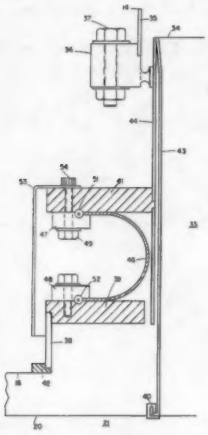
(b) said vacuum vessel containing a liquified gas container;

(c) said liquified gas container providing the cooling necessary to obtain superconducting conditions and being shaped in the form of a horizontal cylinder having a bore therethrough that is coaxial with the bore of said vacuum vessel;

(d) said container being caused to move within the vacuum

vessel axially, radially and transversely due to temperature extremes within said cryostat;

(e) a turret extending radially outward from said vacuum vessel;



(f) a neck tube rigidly attached to and extending radially from said container toward the outside of said vacuum vessel through said turret; and

(g) bearingless means for movably attaching said neck tube to said vacuum vessel whereby, when said container moves, stresses on said neck tube are minimized.

4,713,946

ORNAMENTAL CHAIN

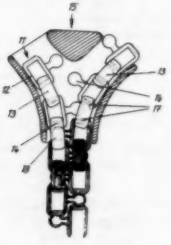
Reiner Hoerkens, Bahnhofstrasse 31, D-6903 Neckargemünd, Fed. Rep. of Germany

Filed Feb. 14, 1986, Ser. No. 829,495

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1985, 3507546

Int. Cl.[4] A44C *11/00*

U.S. Cl. 63—4 **15 Claims**



1. In an ornamental chain comprising

a multiplicity of teeth arranged in two juxtaposed rows, each of said teeth having a tooth portion directed toward the other row and arranged to extend between and to interengage with two adjacent teeth of the other row so as to interconnect said rows, and

interconnecting means connecting adjacent teeth of each of said rows to each other and resisting a separation of adjacent teeth of the same row along said row while permitting adjacent teeth of the same row to move relative to each other when said tooth portions of said teeth of each row are disengaged from adjacent teeth of the other row,

the improvement residing in that

each of said teeth has an end portion which is remote from the other row,

the end portion of each of said teeth of each row comprises two crosspieces, which are spaced apart along said row and extend transversely to a plane containing said chain when it lies on a flat support,

a plurality of rings are provided, each of which surrounds two adjacent ones of said crosspieces of adjacent teeth of the same row,

said crosspieces and said rings constitute said interconnecting means,

each of said rings connecting the teeth of each row is adapted to interengage with said tooth portion of a tooth of the other row to restrict the movement of said tooth portion transversely to said plane,

said end portion of each of said teeth is formed at least on one side with a concave recess, and

the tooth portion of each of said teeth is formed at least on one side with a convexly curved portion adapted to extend into said concave recess of a tooth of the other row.

4,713,947

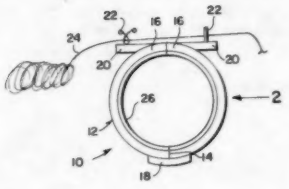
COMFORT RING

William K. Collins, 479 Middle Drive Rd. 6, Bridgeton, N.J. 08302, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007

Filed Mar. 13, 1987, Ser. No. 25,373

Int. Cl.[4] D04B *35/00, 37/00*

U.S. Cl. 66—1 A **4 Claims**



1. A split crochetting ring comprising:

(a) a shank having a split bight and terminating in a pair of offset upper ends;

(b) a flat spring mounted across said split bight of said shank;

(c) a pair of plates, each of which is mounted to one side of one of said offset upper ends of said shank whereby when said plates are squeezed longitudinally towards each other, said shank will open wider to allow said ring onto a finger; and

(d) a pair of guide members, each of which is mounted on one of said plates, said guide members being opposed at a right angle to each other so that yarn can be fed by hand therethrough for a fabric forming process such as crochetting and the like.

4,713,948

DOUBLE BED FLAT KNITTING MACHINE WITH SINKERS LOCATED BETWEEN THE NEEDLES

Henning Schmidt; Walter Nedele, both of Reutlingen, and Hermann Schmodde, Albstadt, all of Fed. Rep. of Germany, assignors to H. Stoll GmbH & Co., Fed. Rep. of Germany

Filed Mar. 23, 1987, Ser. No. 29,195

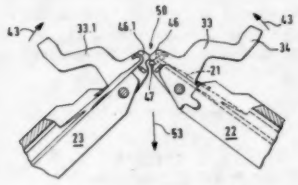
Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3609539

Int. Cl.[4] D04B *15/06, 15/24*

U.S. Cl. 66—106 **5 Claims**

1. A double bed flat knitting machine having needles, which are longitudinally movable in their needle beds, and sinkers between the needles, which sinkers are movable about a common longitudinal axis between a rear and a forward position

and which are controlled by cam elements of the cam carriage, the sinkers being provided, in the stitch-forming region, with a projection, with a stitch-receiving throat underneath the projection and with a loop-forming edge, characterized in that the loop-forming edge of each sinker is formed, with respect to the



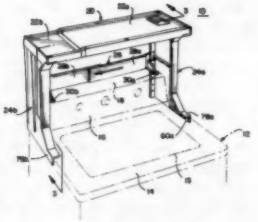
direction of take-down of the knitted fabric, after and underneath the yarn-receiving throat, and further characterized in that the sinkers of the two needle beds are located opposite one another, and in their forward position, in which they form the bridge over the gap between the needle beds are in contact with one another through their projections.

4,713,949

SHELF SYSTEM FOR APPLIANCE

John R. Wilcox, Farrell, Pa., assignor to Top Shelf Company, Inc., West Middlesex, Pa.

Filed Oct. 3, 1985, Ser. No. 783,633
Int. Cl.[4] D06F *39/00*
U.S. Cl. 68—235 R **8 Claims**



1. A shelf assembly for use with an appliance, the appliance having a top work surface with opposing side edges and a control panel disposed at a rear portion of and extending above the top work surface, said shelf assembly comprising:

(a) a tray for providing an additional work surface and having opposing first and second ends;

(b) first and second side support panels disposed substantially vertically, each of said first and second side support panels having a top end attached to a corresponding one of said first and second ends of said tray and a bottom end resting upon the top work surface; and

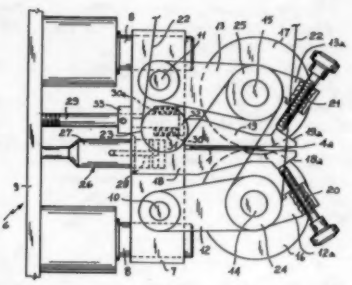
(c) a bracket extending between and attached at opposite ends to said first and second side support panels respectively, said bracket having at least one foot disposed at a height above the top work surface and resting on the top of the control panel to steady said shelf assembly and to orient said additional work surface horizontally.

4,713,950

DEVICE ADAPTED TO MOVE THE SHARPENING GRINDING WHEELS IN A LEATHER SPLITTING MACHINE CLOSE TO AND AWAY FROM A CUTTING BLADE

Paolo Mascetti, Milan, Italy, assignor to Camoga S.p.A., Milan, Italy

Filed Jul. 30, 1986, Ser. No. 891,769
Claims priority, application Italy, May 7, 1986, 21753 B/86
Int. Cl.[4] C14B *1/18*
U.S. Cl. 69—10 **11 Claims**



1. A device to move the sharpening grinding wheels in a leather splitting machine close to and away from a cutting blade comprising:

a pair of grinding wheels symmetrically disposed relative to the bevel of the cutting blade;

a carriage slidably movable along guiding rods;

a pair of arms each of them having one end pivoted on said carriage and the opposite end connected to one of the grinding wheels;

control means adapted to automatically move the carriage from a position in which the sharpening grinding wheels are operatively engaged on the cutting blade bevel to a position in which the grinding wheels are spaced apart from the cutting blade; and

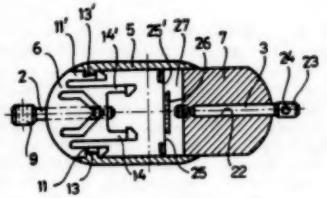
repositioning means designed to automatically return the grinding wheels into engagement with the bevel of the cutting blade.

4,713,951

SEPARABLE KEY HOLDER

Johannes F. Ros, LT Blaricum, Netherlands, assignor to Innovative Concepts Europe B.V., Netherlands

Filed Nov. 4, 1985, Ser. No. 794,725
Int. Cl.[4] A47G *29/10*
U.S. Cl. 70—456 R **9 Claims**



7. A separable key holder comprising:

a first sleeve member comprising:

an axially disposed orifice opening into one end thereof;

a coupling pin slidingly receivable in the orifice and having a first and second end thereof, the first end being provided with a first ring-shaped element for the ac-

commodation of keys thereon and the second end comprising:

a narrowed cylindrical portion; and

a conical portion; and

a pair of resilient spring lips axially extending inside the sleeve and integral therewith, each of the pair having a free end thereof, said free end terminating in a hook-shaped tip, and each of the pair being provided with a triangular shaped protrusion adapted to cooperate with the conical portion to resiliently and laterally displace the lips; and

a second member adapted to be slidingly received in the first member and comprising:

a fixed pin mounted to one end thereof and provided with a second ring-shaped member for the accommodation of keys thereon; and

a pair of apertures adapted to receive and engage the hook-shaped tips;

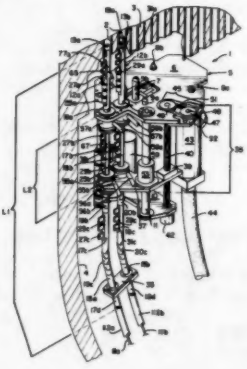
wherein, when the coupling pin is axially displaced, the conical section thereof engages the cooperating protrusions of the lips and laterally displaces said lips, thereby permitting the hooked tips thereof to disengage from the apertures and the two holder members to be detached from each by axially displacing them with respect to each other.

4,713,952

TOOL AND METHOD FOR ROTOPEENING THE PERIPHERAL TUBES IN A TUBESHEET

Robert D. Senger, Unity Township, Westmoreland County; William E. Pirl, Trafford, and Charles H. Roth, Jr., North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 5, 1986, Ser. No. 826,453
Int. Cl.[4] B21D 7/06
U.S. Cl. 72—53 **36 Claims**



24. An improved apparatus for remotely rotopeening the inside walls of the peripheral tubes in a tubesheet, wherein the periphery of the tubesheet abuts a wall, comprising:

(a) at least one rotopeening spindle having a flexible and rotatable outer housing formed from a plurality of jointed segments, each of which is substantially the same length;

(b) a frame means for supporting said spindle, wherein said frame means includes a wall abutting side where said spindle is movably mounted, and a top plate having a connecting and aligning means for detachably connecting said top plate to the tubesheet, and for aligning the spindle into registry with the open end of a selected tube, and

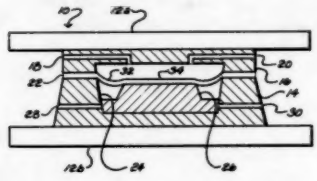
(c) an advancing and retracting means mounted on said wall abutting side of said frame means including a first spindle gripper mounted on said top plate of said frame means for selectively gripping and ungripping the housing of the spindle, and a second spindle gripper reciprocably movable on said wall abutting side of said frame means for selectively gripping and ungripping the housing of the spindle in cooperation with said first spindle gripper in order to remotely and incrementally advance and retract said spindle housing through said top plate, wherein the stroke of said reciprocably movable second gripper is less than the length of two of the segments forming the spindle housing in order to insure that the motion generated by the reciprocably movable second gripper will serve to insert the flexible spindle into the open end of a selected tube.

4,713,953

SUPERPLASTIC FORMING PROCESS

Parviz Yavari, Torrance, Calif., assignor to Northrop Corporation, Hawthorne, Calif.

Filed Dec. 9, 1985, Ser. No. 806,894
Int. Cl.[4] B21D 26/02
U.S. Cl. 72—60 **15 Claims**



1. A method for forming superplastic material in a gas pressurized die having a die cavity defining a topography, said method is partitioned into a plurality of stages corresponding to differing extensions of said material into said die cavity, comprising

determining one of a plurality of rectangular box shapes models which more closely reflects the shape of said die cavity,

analytically modeling in three dimensions the die cavity to one of said plurality of rectangular box shapes having a height, width and length,

analytically modeling a plurality of three dimensional shapes of the superplastic material as said superplastic material deforms into a part defined by said die cavity topography, each of said plurality of three dimensional shapes corresponds to a respective one of said stages,

determining radius equations based upon spherical models penetrating said die cavity, each of said radius equation is based upon spherical models penetrating said die cavity, each of said radius equations corresponds to a respective one of said stages,

determining thickness equations based upon said spherical models penetrating said die cavity, each of said thickness equations is based upon spherical models penetrating said die cavity, each of said thickness equations corresponds to respective said stages,

determining a gas pressure versus time profile comprising determining the pressure versus time profile for each of a plurality of time segments each of which corresponds to a respective one of said stages,

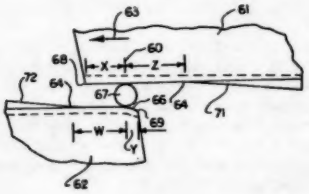
heating said superplastic material to above one-half of the melting point of said superplastic material whereby said superplastic material exhibits superplastic properties, and

applying gas pressure pursuant to said gas pressure versus time profile, said gas pressure is applied against said superplastic material forcing said superplastic material into said die cavity thereby forming said part defined by said cavity topography.

4,713,954
THREAD ROLLING DIES

Richard H. Corrette, Cleveland, Ohio, assignor to Colt Industries Operating Corp., West Hartford, Conn.

Division of Ser. No. 573,019, Jan. 23, 1984, Pat. No. 4,631,947.
This application May 12, 1986, Ser. No. 861,937
Int. Cl.[4] B21H *3/06*
U.S. Cl. 72—88 5 Claims

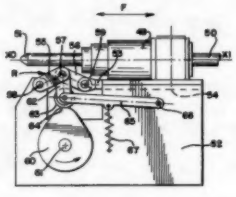


1. A pair of thread rolling dies comprising each die providing a working face extending from a start end to a finish end and provided with thread forming grooves angulated at the helix angle of the threads to be formed, said thread forming grooves cooperating to form threads on a fastener blank by causing said blank to roll between said working faces from said start end to said finish end, a given location on said fastener being progressively and repeatedly formed alternately by thread forming grooves on one working face and then by thread forming grooves on the other working face, an inclined roll-on ramp at the start end of one die along which said blank moves until it is gripped between said working faces to commence the forming of threads thereon, the gripping of said blank between said dies occurring at a location spaced from the start end of said one die by a distance substantially equal to the length of said roll-on ramp, said thread forming grooves being positioned with respect to said working faces so that a match point exists at a location spaced form said start end of said one die and substantially when said blank is first gripped between said working faces.

4,713,955
METHOD PERMITTING THE INCREASE OF OPERATIONS OF COLD PILGER MILLS AND AN APPARATUS FOR THE EMBODIMENT OF THIS METHOD

Pierre Peytavin, Neuilly-sur-Seine, France, assignor to Vallourec, France

Continuation of Ser. No. 688,298, Jan. 2, 1985, Pat. No. 4,658,617. This application Oct. 22, 1986, Ser. No. 922,057
Claims priority, application France, Jan. 5, 1984, 84 00697
Int. Cl.[4] B21B *21/00*
U.S. Cl. 72—208 5 Claims



1. A recoil apparatus for use on a cold pilger mill having a mandrel connected to a mandrel holding shaft, the mandrel located in a pipe blank contacted by grooved rolls which are mounted in a rolls carriage effecting an oscillating movement along the rolling axis of the pipe blank, the recoil apparatus recoiling the mandrel upstream from the pipe blank and thereafter returning the mandrel to its initial position, the recoil apparatus comprising:

a shaft pincer mounted on the mill slideably with respect to the rolling axis, the shaft pincer seizing the mandrel holding shaft near its upstream end;

an articulated holding part connected at a downstream position to the shaft pincer and at an upstream position to the mill, the articulated holding part having at least one pivoted joint along its length; and

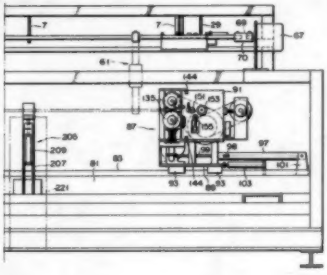
means connected to the pivoted joint for periodically pivoting the articulated holding part about its pivoted joint thereby temporarily shortening the distance between the shaft pincer and the upstream position of the mill connected to the articulated holding part;

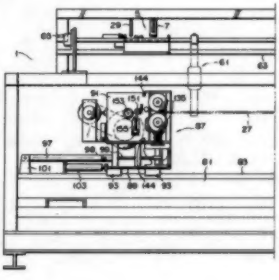
whereby the mandrel, holding shaft and shaft pincer are periodically shifted upstream and returned to their initial position.

4,713,956
APPARATUS FOR MANUFACTURING SPRING UNITS

Noboru Sasaki; Yasuji Iwata, and Teruo Mukai, all of Tokyo, Japan, assignors to France Bed Co., Ltd., Tokyo, Japan

Filed Jun. 29, 1984, Ser. No. 626,435
Claims priority, application Japan, Jul. 4, 1983, 58-120342; Jul. 4, 1983, 58-120343; Jul. 4, 1983, 58-120344; Jul. 4, 1983, 58-120345; Jul. 4, 1983, 58-120346; May 14, 1984, 59-94728
Int. Cl.[4] B21F *35/02, 45/00*
U.S. Cl. 72—137 28 Claims





1. An apparatus for manufacturing coil spring units from a wire (27) comprising:

means (51, 53, 57, 59) for slightly curving both ends of the wire (27);

a frame (1) having guide rails (83);

first and second movable bodies (87) mounted to be freely slidable on the guide rails (83);

means for driving said bodies along the guide rails;

first and second holding means (135) respectively carried on

the paired movable bodies (87) to hold both end sections (27*a*) of the end-bent wire (27);

means (61) for supplying the end-bent wire (27) to the first and second holding means (135) and means for fixedly securing the wire relative to said guide rails;

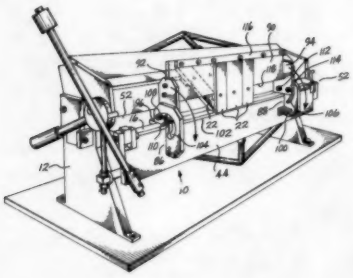
first and second coil forming means (151, 153, 155) respectively carried on the movable bodies (87) to bend into a spiral coil those portions of the wire (27) which respectively extend from the first and second holding means as the movable bodies (87) move toward each other, each of the first and second coil forming means (151, 153, 155) including shaping roller means (153) in abutting contact with the wire (27) to bend it like a coil, guide member means (151) arranged between the shaping roller (153) and the associated one of the first and second holding means (135) for guiding the wire (27) suplied from the associated holding means (135) to the shaping roller (153), the diameter of one turn of the spiral being determined by the distance between the shaping roller means (153) and the guide member means (151), and pitch rod means (155) arranged between the guide member (151) and the shaping roller means (153) to determine the pitch of the sprial formed by the shaping roller means (153).

4,713,957

REVERSE BEND ATTACHMENT FOR A SHEET METAL BRAKE

Ernest J. Eder, 16810-27th Ave. SW., and Laverne D. Goodwin, 16901-27th Ave. SW., both of, Seattle, Wash. 98166

Filed Aug. 12, 1986, Ser. No. 895,788
Int. Cl.[4] B21D *5/04*
U.S. Cl. 72—319 **15 Claims**



1. For use with a sheet metal box and pan brake of a type comprising a bed including a sheet metal support having an elongated edge; clamp means including forming edge means which is positioned substantially vertically above the support edge when the clamp means is functioning to clamp a sheet metal member against said support; and a bending leaf which is pivotally attached to said bed, for pivotal movement between a down position and an up position, said bending leaf having an edge surface which is generally coplanar with the support surface of the bed when the bending leaf is in its down position, said bending leaf having an outer side and a right angle outer corner formed where said edge surface intersects the outer side of the bending leaf, a reverse bend making attachment comprising:

a pair of spaced apart end mounts detachably connectable to said brake, each said end mount having a first position for extending over the support of the bed and a second portion for extending downwardly from the first portion outwardly adjacent the outer side of the bending leaf;

a bending member extending longitudinally between said end mounts;

means pivotally connecting the bending member to said end mounts, for pivotal movement between a start position and a forming position;

said bending member having a force applying surface means, wherein when the bending member is in its start position, and a sheet metal member is clamped between the bed and the clamp means of the brake, and extends horizontally outwardly from the outer side of the bending leaf, said surface means makes contact with an upper surface portion of the sheet metal member at a location immediately outwardly of said right angle corner on the bending leaf; and

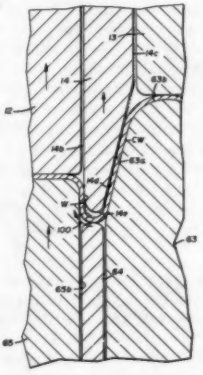
said means for pivotally connecting comprising a pair of arcuate slots, one in each end mount, having centers substantially coinciding with said right angle corner, and bearing means carried by the bending member and extending into said slots, said bearing means mounting the bending member for pivotal movement between its start and bending positions about an axis coinciding with said right angle corner on the bending leaf.

4,713,958

METHOD AND APPARATUS FOR FORMING CONTAINER END PANELS

Joseph D. Bulso, Jr., Canton, and James A. McClung, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Filed Oct. 30, 1986, Ser. No. 924,835
Int. Cl.[4] B21D *51/44*
U.S. Cl. 72—348 **10 Claims**



1. A method of forming a container end panel from a blank of material comprising the steps of:

(A) forming a cup-shaped member having a formed bottom panel and an annular peripheral section; and

(B) holding a portion of said peripheral section and forming a countersink radius adjacent said bottom panel by pulling material from said peripheral section.

4,713,959

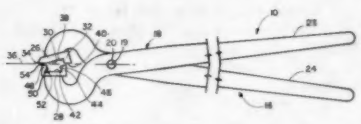
TOOL FOR COUPLING SECTIONS OF AIR CONDITIONING DUCTS

Richard Bennett, 1600 E. Ocean Blvd. #8, Long Beach, Calif. 90802

Filed May 30, 1986, Ser. No. 868,686
Int. Cl.[4] B21D *7/06*
U.S. Cl. 72—410 **18 Claims**

1. A tool for use in connecting together sections of air conditioning ducts comprising a pair of co-operating first and second levers which are joined at a fulcrum between their extremities to define opposing handles on one side of said fulcrum and opposing jaws on the opposite side of said fulcrum, and said jaw of said first lever has a bearing surface including a flat face

and a heel disposed at right angles to each other to concavely face said jaw of said second lever, and said jaw of said second lever is of a U-shaped configuration concavely facing said jaw of said first lever and has a flat floor, a heel and a lip, configured so that said heel of said jaw of said second lever extends outwardly from said flat floor between said flat floor and said



fulcrum and is aligned to bear against said heel of said jaw of said first lever, and the edge of said heel of said jaw of said second lever remote from said fulcrum and proximate to said flat floor is chamfered, and said lip projects outwardly from said flat floor to bear against a portion of said bearing surface of said jaw of said first lever.

4,713,960

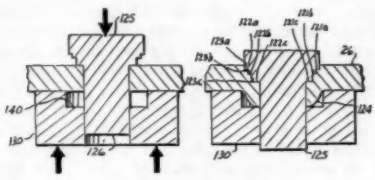
METHOD FOR FORMING A COUNTERSINK IN A PLATE

J. Scott Gassaway, 2356 Glendon, Los Angeles, Calif. 90064

Division of Ser. No. 562,849, Dec. 19, 1983, Pat. No. 4,634,009. This application Aug. 8, 1986, Ser. No. 894,967

Int. Cl.[4] B21D *53/00*

U.S. Cl. 72—412 **2 Claims**



1. A method to form a countersink in a plate having a pair of parallel surfaces, a hole through said plate between said surfaces, said plate being made of a material which can be work-hardened, said method comprising:

utilizing a punch having an axis, an axially extending substantially circularly cylindrical stem and a peripheral head adjacent to said stem, said head having a pressure face adjacent to said stem, coaxial therewith, and projecting radially beyond it, said pressure face having a plurality of ring-like steps, each step having a substantially flat base surface and a substantially circularly cylindrical peripheral wall surface, the diameter of each step farther from said stem being larger than the diameter of its contiguous step that is close to said stem, said stem having no radial dimension larger than the dimension contiguous to the step closest to said stem;

leaving unrestrained an annular ring of one of said plate surfaces contiguous to said hole, and restraining said one surface against axial displacement around said ring, whereby the metal within said ring is capable of limited axial displacement;

pressing said punch into said hole, stem first, the diameter of the stem closely approximating the diameter of the hole, continuing to press the punch into said hole with such a force and at such a rate as to cause deformation, but not shearing, of the metal, whereby the steps indent into the other of said plate surfaces to form a stepped countersink with coldworked surfaces, and the material inside said ring deforming downwardly to form a raised ring, and the diameter of the hole below said countersink equallying that of the stem; and

withdrawing the punch from the plate.

4,713,961

TRANSFER PRESS

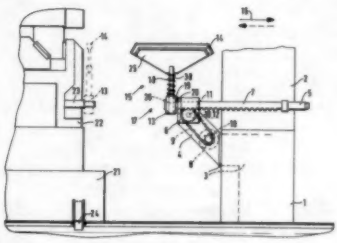
Herbert Hoehn, Goeppingen, and Kurt Strommer, Kuchen, both of Fed. Rep. of Germany, assignors to L. Schuler GmbH, Goeppingen, Fed. Rep. of Germany

Filed Feb. 11, 1986, Ser. No. 828,183

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504765

Int. Cl.[4] B21D *43/20*

U.S. Cl. 72—419 **18 Claims**



1. An installation for transferring workpieces from a moveable work station means to a plurality of different idle areas, each associated with a press installation whereat the workpiece can be stored, comprising: a plurality of press installations each having an idle area adjacent thereto; each press installation including a movable work station means moveable between idle areas; gripping and retaining means arranged at each idle area for gripping and retaining supporting element means used to hold workpieces; each supporting element means detachably attached to mounting means carried by the moveable work station means to be moved adjacent an area of one of the idling areas by said gripping and retaining means; said mounting means coordinated to each gripping and retaining means; said gripping and retaining means being operable to be set into rotary motion by a rotary drive means; said gripping and retaining means moveable towards said mounting means to detach said supporting element means from said mounting means; said rotary drive means rotating said supporting element means after detachment from said mounting means; and said gripping and retaining means being able to move said supporting element means into the idle area of its associated press installation.

4,713,962

TEST DEVICE FOR A DENTAL PERCUSSION INSTRUMENT

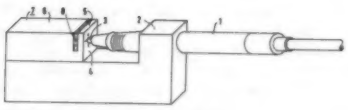
Juergen Wohlgemuth, Darmstadt, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 27, 1985, Ser. No. 802,255

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1984, 3445507

Int. Cl.[4] G01L *5/00*

U.S. Cl. 73—11 **12 Claims**



1. A test device for a dental percussion instrument, which instrument contains a movably seated ram which is accelerated to a definite speed preferably with the assistance of a magnetic drive, which is electronically controlled to sequentially move the ram toward a test subject in free flight with a constant

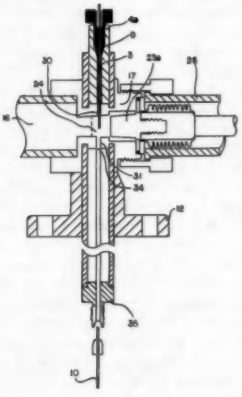
speed and after impact of the end of the ram against the test subject, the ram being returned to its initial position by the drive, said test device including a test member being situated externally of the percussion instrument and having a seating surface for the end of the ram to strike, and means for mounting said test member to have the elasto-mechanical properties corresponding to those of the test subject, said means for mounting including a carrier member of a solid body of material with a slot to form the test member as a component part of said carrier member.

4,713,963

METHOD AND DEVICE FOR VACUUM CHROMATOGRAPHY

Daryl Sharp, 317 Woodhaven, Chapel Hill, N.C. 27514

Filed Jun. 26, 1986, Ser. No. 879,022
Int. Cl.[4] G01N *31/08*
U.S. Cl. 73—23.1 **21 Claims**



1. A device for analysis of a sample using a mass spectrometer and a sample introduction column, said sample introduction column having a first end and a second end, said sample being deposited in a thin film on an adsorbent coating on the interior of the first end of the sample introduction column comprising:

(a) an MS transfer column having a bore greater in diameter than the exterior of said sample introduction column; said bore having a chromatographic surface; said MS transfer column having a first end and a second end; said first end of said MS transfer column being insertable into the mass spectrometer source;

(b) a means for connecting the second end of said sample introduction column to a carrier gas source;

(c) an enclosed chamber into which the second end of said MS transfer column and the first end of said sample introduction column may be inserted;

(d) a means for axially aligning the sample introduction column and MS transfer column;

(e) a means for applying a vacuum source to said enclosed chamber;

(f) a means for supporting said sample introduction column at a point outside of said enclosed chamber; and

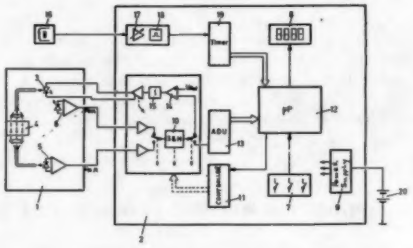
(g) a means for moving said sample introduction column along its axis so that the extent to which it is inserted into the MS transfer column may be controlled.

4,713,964

DEVICE FOR OPTICAL TURBIDITY MEASURING OF GASES

Gregor Ioannides, Furth, Fed. Rep. of Germany, assignor to Grundig E.M.V. Elektro-Mechanische Versuchsantalt Max Grundig holland.Stiftung & Co. KG, Fuerth/Bay, Fed. Rep. of Germany

Filed Jul. 16, 1986, Ser. No. 887,022
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526458
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—116 **13 Claims**



1. A device for measuring the soot content of gases discharged by diesel engines comprising:

a chamber disposed in a flow of gases discharging from said engine;

a light source for projecting light through said chamber;

a light sensor disposed opposite said light source for generating a signal corresponding to the intensity of light passing from said source through said chamber; and

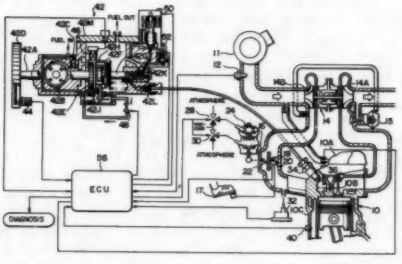
signal processing means for processing said signal and generating output signals indicative of said soot content, said signal processing means including means for storing a plurality of signals from the light sensor and determining the average and peak values of said signals for a predetermined number of said signals.

4,713,965

METHOD AND SYSTEM FOR DETECTING FUEL INJECTION TIMING IN A DIESEL ENGINE

Fumiaki Kobayashi, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 7, 1986, Ser. No. 882,380
Claims priority, application Japan, Jul. 8, 1985, 60-149498
Int. Cl.[4] G01M *15/00*
U.S. Cl. 73—119 A **16 Claims**



1. A method of detecting fuel injection timing in a diesel engine having a fuel injection pump, wherein a member is provided for converting rotary motion of a pump driving shaft into reciprocating motion of a fuel pressure-feed plunger, said converting member being rotatable relative to said pump driv-

ing shaft to vary the starting position of the compression stroke of said fuel pressure-feed plunger so as to control fuel injection timing, comprising the steps of:

(a) directly detecting a crank angle reference position which corresponds to a specific crank angle from rotation of a member rotatable in association with rotation of said engine, which is disposed outside said fuel injection pump;

(b) detecting a predetermined pump angle from rotation of said converting member relative to said pump driving shaft, in said fuel injection pump; and

(c) determining fuel injection timing from the phase difference between the crank angle reference position and the predetermined pump angle.

4,713,966

METHOD AND APPARATUS FOR VOLUME MEASUREMENT

Carl H. Thyren, Malmö, and Tore Hesthamar, Lund, both of Sweden, assignors to Enpece AB, Lund, Sweden

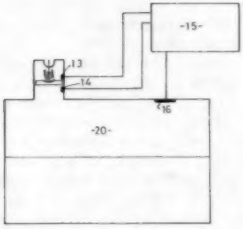
PCT No. PCT/SE85/00537, § 371 Date Oct. 16, 1986, § 102(e) Date Oct. 16, 1986, PCT Pub. No. WO86/03834, PCT Pub. Date Jul. 3, 1986

PCT Filed Dec. 20, 1985, Ser. No. 916,545

Claims priority, application Sweden, Dec. 21, 1984, 8406547

Int. Cl.[4] G01F *17/00*

U.S. Cl. 73—149 **2 Claims**



1. A method of measuring the volume (v) of a gas in a container, comprising varying the container volume according to a sine wave between a minimum and a maximum value, said variation being effected at a constant frequency but at a varying amplitude, in order to obtain a predetermined pressure difference (Δp) of the gas in the container; determining the volume difference (ΔV) corresponding to said predetermined pressure difference (Δp) by detecting the points of time when at least two points on said sine wave are attained which correspond to two predetermined values of the container volume; measuring the time between the said two points on said sine wave and using said measurement for calculating the maximum and the minimum value of the volume (V), which are used for calculating the volume difference (ΔV) corresponding to said predetermined pressure difference (Δp); and calculating the volume (V) on the basis of the formula $V=\Delta V x p_0 x \eta/\Delta p$ wherein p_0=the static pressure and $\eta=Cp/Cv$, wherein Cp and Cv are the specific heat capacity at, respectively, constant pressure and constant volume of the gas within the container.

4,713,967

METHOD AND APPARATUS FOR MEASURING A WATER CONDITION

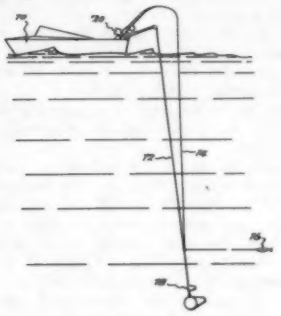
Ronald R. Overs, 96 Fox Hunt La., East Amherst, N.Y. 14051, and Darold Wobshall, Williamsville, N.Y., assignors to Ronald R. Overs, East Amherst, N.Y.

Filed Mar. 31, 1986, Ser. No. 846,248

Int. Cl.[4] G08C *19/00*; H04B *3/46*

U.S. Cl. 73—170 A **18 Claims**

1. A method for measuring at least one water condition proximate a desired location in the water, said method comprising: positioning a sensor for such condition proximate said location, which sensor provides an electrical signal proportional to said condition, modulating a high frequency radio signal using said electrical signal to form a modulated radio signal, transmitting said modulated signal along a conductive



line, detecting said modulated signal from the line and utilizing said detected signal to drive an observable indicator of said condition, wherein said desired location is proximate a fishing bait and the conductive line is a down rigger line.

4,713,968

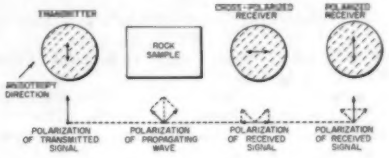
METHOD AND APPARATUS FOR MEASURING THE MECHANICAL ANISOTROPY OF A MATERIAL

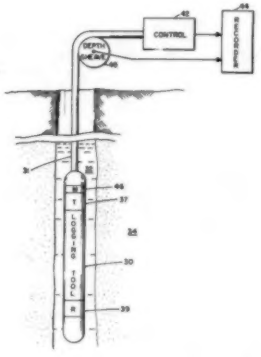
David P. Yale, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 22, 1986, Ser. No. 865,999

Int. Cl.[4] G01V *1/40*; E21B *49/00*

U.S. Cl. 73—594 **12 Claims**





1. A method for determining the azimuthal direction of the mechanical anisotropy of a material, comprising the steps of:

(a) transmitting polarized shear acoustic energy through said material with a polarized transmitting shear transducer,

said acoustic energy being repolarized within said material into a pair of shear waves of differing polarizations, a first of said shear waves having a plarization parallel to the azimuthal direction of the mechanical anisotropy of the material and a second of said shear waves having a plarization perpendicular to the azimuthal direction of the mechanical anisotropy of the material;

(b) receiving polarized shear acoustic energy which has traveled through said material with a polarized receiving shear transducer which is cross-polarized with respect to said transmitting shear transducer,

(c) synchronously rotating the azimuthal direction of said shear acoustic energy transducers with respect to said material, and

(d) measuring the amplitudes and phases of both the transmitted and received shear acoustic energies as a functioned of the azimuthal rotation of said transmitting and receiving shear acoustic energy transducers,

(e) comparing the phase of said cross-polarized received shear acoustic energy with the phase of the transmitted shear acoustic energy as a function of the azimuthal rotation of said shear acoustic energy transducers,

(f) detecting the pair of perpendicular azimuthal directions for which the amplitude of the cross-polarized received shear acoustic energy is at a minimum,

(g) detecting at least a first quadrant between said pair of perpendicular azimuthal directions for which said transmitted and cross-polarized received shear waves are in-phase with respect to one another,

(h) detecting at least a second quadrant between said pair of perpendicular azimuthal directions in which said transmitted and cross-polarized received shear acoustic energies are out-of-phase with respect to one another, and

(i) identifying the azimuthal direction of the mechanical anisotropy of said material from the relationship of said pair of perpendicular azimuthal directions and said first and second quadrants.

4,713,969

DIFFERENTIAL PRESSURE TRANSMISSION APPARATUS

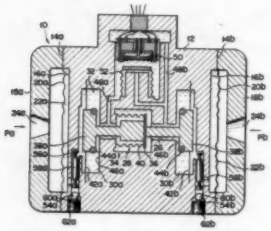
Akira Ishii, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 655,445, Sep. 28, 1984, abandoned. This application Apr. 10, 1987, Ser. No. 37,129

Claims priority, application Japan, Sep. 30, 1983, 58-182620; Sep. 30, 1983, 58-182646

Int. Cl.[4] G01L *13/02, 13/06*

U.S. Cl. 73—706 **21 Claims**



1. A differential pressure transmission apparatus comprising:

a body having therein a pressure transmission passage filled with a pressure transmission medium, said pressure transmission passage having a high-pressure side end and a low-pressure side end, these ends being open at the outer surface of the body;

a high-pressure side pressure-receiving diaphragm, mounted on the body and closing the high-pressure side end of the pressure transmission passage, for receiving a high-pressure side pressure and for transmitting the pressure to the medium;

a low-pressure side pressure-receiving diaphragm, mounted on the body and closing the low-pressure side end of the pressure transmission passage, for receiving a low-pressure side pressure and for transmitting the pressure to the medium;

differential-pressure/displacement converting means disposed in the body, partitioning the pressure transmission passage into a high-pressure side section and a low-pressure side section, and being displaceable according to pressure differences between these sections;

a pressure-sensing element for detecting pressure differences between the pressure in the high-pressure side section and the pressure in the low-pressure side section;

first throttle means, disposed in the high-pressure side section, for attenuating pressure variations transmitted from the high-pressure side pressure-receiving diaphragm, said first throttle means establishing a first throttling cross-sectional area disposed between a first portion of the high-pressure side section adjacent the high-pressure side pressure-receiving diaphragm and a remaining portion of the high-pressure side section;

second throttle means, disposed in the low-pressure side section, for attenuating pressure variations transmitted from the low-pressure side pressure-receiving diaphragm, said second throttle means establishing a second throttling cross-sectional area disposed between a first portion of the low-pressure side section adjacent the low-pressure side pressure-receiving diaphragm and a remaining portion of the low-pressure side section;

first and second medium seal ports formed in the body;

first filling means for filling the high-pressure side section with the medium, the first filling means comprising means for establishing first filling flow paths having respective minimum cross-sectional areas that are greater than the first throttling cross-sectional area and that respectively communicate the first and remaining portions of the high-pressure side section with the first medium seal port; and

second filling means for filling the low-pressure side section with the medium, the second filling means comprising means for establishing second filling flow paths having respective minimum cross-sectional areas that are greater than the second throttling cross-sectional area and that respectively communicate the first and remaining portions of the low-pressure side section with the second medium seal port.

4,713,970

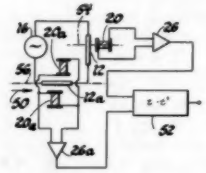
THERMAL DIFFUSION FLUID FLOW SENSOR

David K. Lambert, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 645,253, Aug. 29, 1984, Pat. No. 4,576,050. This application Mar. 12, 1986, Ser. No. 838,929

Int. Cl.[4] G01F *1/68;* **G01P** *5/10*

U.S. Cl. 73—861.05 **7 Claims**



1. A fluid flow sensor for location contiguous to a body of fluid subject to flow to be measured, comprising:

a thin film substrate having a thermal diffusivity substantially less than that of the fluid and having a thermal conductivity substantially greater than that of the fluid;

thermal oscillation means on the surface of the substrate for generating thermal oscillations in the fluid, whereby thermal oscillations are propagated through the fluid at a rate dependent on fluid flow to substrate surface locations spaced from the oscillation means;

primary and reference thermal oscillation detector means on the substrate surface equally spaced from the oscillation means for providing primary and reference output signals corresponding to the thermal oscillations at the detector means, the reference detector means having the same sensitivity to temperature and pressure as the primary detector means;

the oscillation means and the primary detector means having an axis of symmetry parallel to the nominal direction of flow so that the primary detector output signal is substantially insensitive to small changes in flow direction and being arranged for sensing thermal oscillations propagated generally in one direction parallel to the nominal direction of flow;

the oscillation means and reference detector means having an axis of symmetry parallel to the nominal direction of flow so that the reference detector output signal is as insensitive to small changes in flow direction as the primary output signal and being arranged for sensing thermal oscillations propagated in the opposite direction parallel to nominal direction of flow; and

signal responsive means coupled to the primary and reference detector means for producing an output correlated to the fluid flow near the substrate surface, and the signal responsive means includes means for compensating for effects of changes in fluid pressure and temperature and small changes in flow direction comprising circuitry for determining the relative phase of the detector outputs.

4,713,971

DEVICE FOR DETERMINING THE VELOCITY IN A FLOWING FLUID BY USE OF THE ACOUSTIC DOPPLER-EFFECT

Wilhelmus Johannes, Tuinstraat 37, 2613 RB Delft, Netherlands

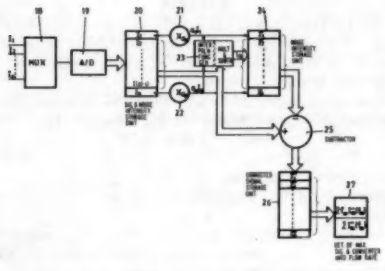
PCT No. PCT/NL85/00035, § 371 Date May 27, 1986, § 102(e) Date May 27, 1986, PCT Pub. No. WO86/01605, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 23, 1985, Ser. No. 865,727

Claims priority, application Netherlands, Aug. 24, 1984, 8402588

Int. Cl.⁴ G01F *1/66*

U.S. Cl. 73—861.25 **3 Claims**



1. In a device for determining the velocity in a flowing fluid, of the type including an ultrasound transmitter and a receiver coupled therwith for receiving ultrasounds reflected from the fluid, which are amplified and demodulated therein so as to produce a low-frequency Doppler-signal, a spectrum analyser for detecting the frequency of said Doppler-signal, consisting of a number (n) of bandpass filters of different passband frequency ranges, peak detectors for measuring the energy values of the respective individual frequency components passed by said bandpass filters, and a calculation unit for calculating the frequency at which the low-frequency Doppler-signal appears to have a maximum, the latter being a measure for the mean flow velocity, the improvement comprising, in combination means, in said calculation unit, for providing a first decrementation factor for the frequency component passed by the bandpass filter which has the lowest passband frequency range and a second decrementation factor, which is smaller than said first decrementation factor and therefore produces more decrementation than said first decrementation factor, for the frequency passed by the bandpass filter which has the highest passband frequency range, interpolating means for providing respective decrementation factors for said frequency components passed respectively by the remainder of said bandpass filters, by reference to a monotonic interpolation function for interpolating between said first and second decrementation factors, means for multiplying said measured energy values respectively by said decrementation factors to produce noise energy values and means for subtracting said noise energy values from the respective corresponding measured energy values to produce corrected energy values.

4,713,972

POCKET AIR VELOCITY GAUGE

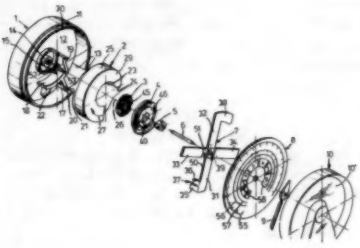
Hans-Dieter Stockburger, Richard Wagner Str. 15, 7730 Villingen-Schwenningen, Fed. Rep. of Germany

Filed Jun. 19, 1986, Ser. No. 876,225

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1985, 3522001

Int. Cl.⁴ G01F *1/28*

U.S. Cl. 73—861.76 **18 Claims**



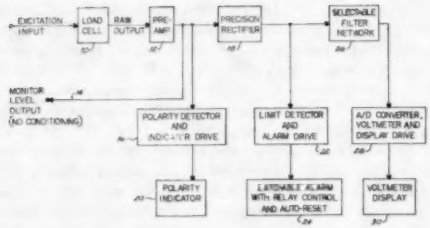
1. A pocket air velocity gauge comprising, a housing defining a space, a central pointer shaft mounted for rotation to said housing about an axis, means defining a ring channel in said space around said axis, said housing having an inlet into one end of said channel and an outlet into an opposite end of said channel for the flow of air into said inlet, in a flow direction along said channel and out of said outlet, said channel increasing in cross-sectional area from said inlet to said outlet, a lever arm connected to said pointer shaft, an air vane connected to said lever arm and disposed in said ring channel, air entering said inlet opening striking said vane to rotate said lever arm around said axis, a first restoring spring operatively connected to said lever arm for exerting a restoring force on said lever arm for biasing said vane toward said inlet, said first restoring spring being active to bias said vane through the entire rotation of said lever arm, a second restoring spring, engagement means operatively connected between said second restoring spring and said lever arm for connecting said second restoring spring to said lever arm only after said lever arm has rotated a selected angle to bias said vane back toward said inlet only after said lever arm has rotated said selected angle, a pointer connected to said pointer shaft and a dial scale connected to said housing over which said pointer moves to indicate a rotation of said pointer shaft.

4,713,973

INDICATOR WITH STAGED DATA PROCESSING

Joseph T. Woyton, 106 Braddock Dr., Mauldin, S.C. 29662

Filed Oct. 15, 1985, Ser. No. 787,058
Int. Cl.[4] G01L *1/22*; G01D *1/18*
U.S. Cl. 73—862.67 **21 Claims**



1. An apparatus of multiple, generally separate stages for processing input data comprising mechanical-deformation data from a load cell comprising a strain guage, said apparatus comprsing:

pre-amplifier means for receiving and amplifying said data generally without otherwise conditioning same;

rectifier means, separate from said pre-amplifier means, for rectifying said amplified data;

meter means, responsive to said rectified, amplified data, for outputting and displaying an absolute signal level indication thereof, and

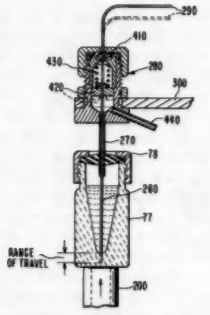
polarity indicator means, responsive to said amplified generally non-conditioned data which has a substantially wide bandwidth, for outputting and displaying a polarity indication thereof, whereby absolute signal level and relatively high-frequency polarity indications are separately and accurately provided.

4,713,974

AUTOSAMPLER

Stanley A. Stone, State College, Pa., assignor to Varian Associates, Inc./Scientific Systems, Inc., Palo Alto, Calif.

Filed Apr. 18, 1986, Ser. No. 853,493
Int. Cl.[4] G01N *30/24*
U.S. Cl. 73—864.23 **19 Claims**



1. An autosampler for use in liquid chromatography comprising:

carousel means for holding at least one vial rack having a plurality of recesses for receiving liquid-containing vials;

a fixed needle assembly for withrawing liquid from said vial;

vial lifter means in vertical alignment with said fixed needle assembly for lifting individual vials out of said vial recesses and impaling said vials on said needle assembly;

means for moving said carousel to align said vial recesses with said vial lifter means;

said needle assembly comprising a sample needle having a limited range of vertical travel such that the needle will move upward when it contacts the bottom of a vial being lifted.

4,713,975

DENSE STAR POLYMERS FOR CALIBRATING/CHARACTERIZING SUB-MICRON APERTURES

Donald A. Tomalia, and Larry R. Wilson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 30, 1986, Ser. No. 868,979
Int. Cl.[4] G01N *33/00, 33/483, 15/08*
U.S. Cl. 73—865.8 **18 Claims**

1. In a substance having at least one aperture of a diameter of about 10,000 Angstroms or less, a process for measuring and characterizing the diameter of said aperture, comprising:

(a) contacting said substance with a solution of a plurality of dense star polymers having at least one core branch emanating from a core, each core branch having at least one terminal group provided that (1) the ratio of terminal groups to the branches emanating from the core is 2:1 or greater, (2) the density of terminal groups in the dense star polymer is at least 1.5 times that of an extended conventional star polymer having similar core and monomeric moieties and a comparable molecular weight and number of core branches wherein each of such branches of the extended conventional star polymer bears only one terminal group, (3) a molecular volume that is equal to or less than 80 percent of the molecular volume of said extended conventional star polymer, and (4) the two-dimensional molecular diameter of the dense star polymer is in the range from about 8 to about 10,000 Angstroms;

(b) passing through or into said aperture at least one dense star polymer having a molecular diameter of about equal to or less than the diameter of said aperture; and

(c) calculating the diameter of said aperture from measurements of either those dense star polymers passing therethrough or thereinto said aperture, of those dense star polymers not passing therethrough or thereinto, or of the combined measurements of those dense star polymers passing therethrough or thereinto said aperture and those not passing therethrough or thereinto.

4,713,976

DIFFERENTIAL HAVING A GENERALLY SPHERICAL DIFFERENCING ELEMENT

Donald F. Wilkes, Albuquerque, N. Mex., assignor to Vern Heinrichs, Toronto, Canada

Continuation-in-part of Ser. No. 714,950, Mar. 22, 1985, abandoned. This application May 16, 1985, Ser. No. 734,347
Int. Cl.[4] F16H *15/00*
U.S. Cl. 74—190 **18 Claims**

1. A differential mechanism comprising:

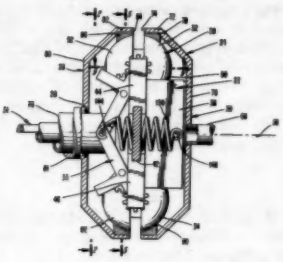
support means for mounting the mechanism on a central axis;

input means for delivering rotary power to the mechanism;

output means for receiving rotary power from the mechanism, supported by the input means;

differencing means for establishing a rotary speed relationship between the input means and the output means, the differencing means frictionally engaging the output means at a first zone and frictionally engaging the input means at a second zone, the distance of the first zone and the distance of the second zone from the central axis being essentially constant, said differencing means including a generally spherical element frictionally engaging both the input means and the output means at the first and second zones, and being rotatable about a ball axis, the ball axis being

adjustable in a plane defined by said ball axis and the central axis such that the angle between the ball axis and the central axis is related to the relative rotational speeds of the input means and the output means, and the ball axis being movable through an angle of about 120° including a position disposed between the first zone and the second zone so that the input means and the output means can rotate in the same direction as well as in opposite directions;



loading means carried by the support means, engaging the differencing means to exert a radially outwardly directed force pressing the spherical element to the first zone and the second zone; and

control means operably connected with the differencing means for regulating the differencing means to control the rotary speed relationship between the input means and the output means.

4,713,977

FRICTION-DISK TRANSMISSION COMPRISING A TILTABLE DISK

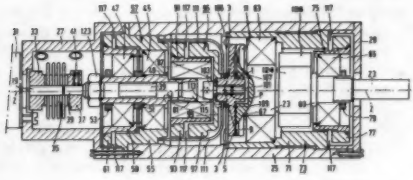
Marinus P. Koster; Hermanus M. J. R. Soemers, and Marinus J. J. Dona, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 14, 1986, Ser. No. 839,408

Claims priority, application Netherlands, Nov. 15, 1985, 8503140

Int. Cl.⁴ F16H *15/16*

U.S. Cl. 74—191 **7 Claims**



1. A friction-disk transmission comprising

a first shaft and a second shaft, each of said first shaft and said second shaft extending along a common axis of rotation, and each of said first shaft and said second shaft being rotated about said common axis;

a circular disk arranged between said first shaft and said second shaft, said circular disk being tilted at a point on said common axis about two orthogonal axes intersecting at said point, said two orthogonal axes being perpendicular to said common axis;

drive means coupled with said circular disk for providing eccentric motion about said common axis;

stationary fixing means surrounding said circular disk for preventing said circular disk from being rotated about said common axis;

spring means annularly surrounding said circular disk for supporting said circular disk to said stationary fixing means, said spring means being secured to an inner portion of said stationary fixing means and an outer portion of said circular disk; and

supporting means coupled with said second shaft for determining rotation of said circular disk about said two orthogonal axis, said circular disk being rolled with frictional contact across said supporting means;

wherein a contact point between said circular disk and said supporting means provides said frictional contact in a circular path, said supporting means occupying a fixed axial position with respect to said common axis.

4,713,978

AUTOMOTIVE TRANSMISSIONS OF THE ROLLING TRACTION TYPE

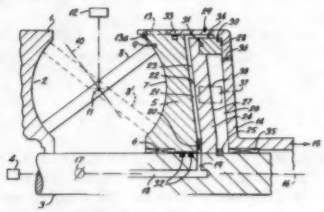
Forbes G. D. B. Perry, Charlbury, England, assignor to National Research Development Corporation, London, England

Filed Jan. 23, 1986, Ser. No. 828,851

Claims priority, application United Kingdom, Jan. 30, 1985, 8502318

Int. Cl.⁴ F16H *15/38, 15/08*

U.S. Cl. 74—200 **9 Claims**



1. A rolling traction automotive transmission comprising:

a rotary first component;

second and third components;

means to generate an axial force to urge the said rotary first component into rolling contact with said second component, said means comprising a clearance between said first and said third components, which clearance includes an annular chamber coaxial with the said first component and adapted to be filled with pressurized fluid;

a first axially-facing bounding surface of said chamber, presented by said first component;

a second axially-facing bounding surface of said chamber, presented by said third component;

a ring seal presenting a sealing face which provides a third bounding surface of said chamber and bridges the said clearance between said first and third components;

said sealing face facing radially-outwardly relative to said first component, so that pressurized fluid within said chamber bears radially-inwardly relative to said first component against said ring seal, so putting said ring seal into compressive hoop stress.

4,713,979

TRANSMISSION WITH REVERSE MECHANISM

Osamu Muto, Tokyo; Masanori Masumura, and Yoshiaki Hori, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1986, Ser. No. 946,359

Claims priority, application Japan, Dec. 27, 1985, 60-294707

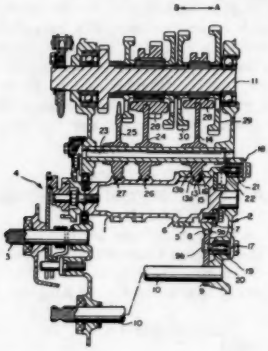
Int. Cl.⁴ F16H *5/06*

U.S. Cl. 74—337.5 **6 Claims**

1. A transmission having forward gears and a reverse gear, comprising

a forward shift drum having a forward gear lead groove therein;

a reverse shift drum concentrically arranged with said forward shift drum, said reverse shift drum being rotatable relative to and axially fixed relative to said forward shift drum, said reverse shift drum having a reverse gear lead



groove therein overlapping said forward gear lead groove; and

a shift fork pin for one of the forward gears and the reverse gear being engaged in said forward and reverse lead grooves.

4,713,980

LUBRICATION MECHANISM IN POWER TRANSFER DEVICE FOR FOUR WHEEL DRIVE

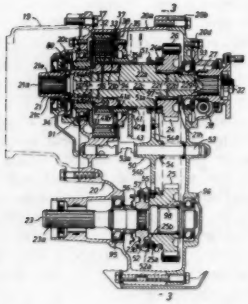
Shuichiro Ida; Toshio Yoshinaka, and Shuji Nagano, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 27, 1986, Ser. No. 866,911

Claims priority, application Japan, May 24, 1985, 60-112908

Int. Cl.[4] F16H *57/04*

U.S. Cl. 74—467 **10 Claims**



1. A power transfer device adapted for use in combination with a primary power transmission for automotive vehicles, comprising:

a housing;

an input shaft rotatably mounted within said housing and having an input end for drive connection to an output shaft of said power transmission;

an output shaft arranged coaxially with said input shaft and rotatably mounted within said housing for relative rotation to said input shaft;

an auxiliary change-speed mechanism arranged within said housing and mounted on said input shaft, said change-speed mechanism having an input element mounted on said input shaft for rotation therewith and an output element connectable to said output shaft; and

a sleeve member axially slidably mounted on said output shaft and shiftable between a first position in which it effects a drive connection between said input and output shafts and a second position in which it effects a drive connection between the output element of said change-speed mechanism and said output shaft;

wherein a bearing retainer is secured in a fluid-tight manner to an outer end of said housing, said bearing retainer retaining a bearing carried on said housing for supporting thereon said input shaft, and wherein an oil pump assembly is contained within a cavity of said bearing retainer and mounted on said input shaft at the outside of said housing to be driven by rotation of said input shaft, said pump assembly being arranged to pump up lubricating oil stored in said housing and supply it into an axial bore in said input shaft adjacent to said pump assembly.

4,713,981

REMOTE ACTUATING MECHANISM

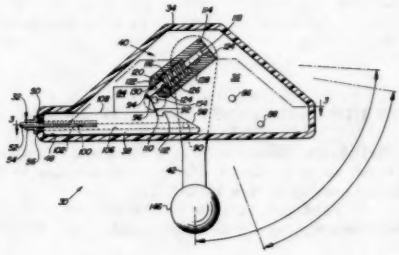
Werner Zahn, Altlussheim, Fed. Rep. of Germany, assignor to Deere & Company, Moline, Ill.

Filed Jul. 3, 1986, Ser. No. 881,886

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1985, 3523762

Int. Cl.[4] G05G *11/00*

U.S. Cl. 74—479 **9 Claims**



1. A remote actuating mechanism comprising:

an actuating lever;

a driver rigidly coupled to said actuating lever for swinging motion therewith and having a spring loaded driving pin; and

a longitudinally movable transmission unit having a recess for receiving the driving pin in a positively coupled engagement relationship sustainable over a range of movement less than the swinging range of movement of said lever and driver, the spring loading of said driving pin permitting said driver to engage said recess at any position over said range.

4,713,982

INTEGRAL GEAR BOX AND ELECTRICAL GENERATING SYSTEM

Theodore D. Fluegel, and Daniel M. Ryan, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 27, 1985, Ser. No. 813,784

Int. Cl.[4] F16H *37/08, 47/04;* F02C *7/275*

U.S. Cl. 74—686 **4 Claims**

1. In a power plant including a turbine with a shaft, and a power take-off from the shaft, a gear box and accessory unit comprising:

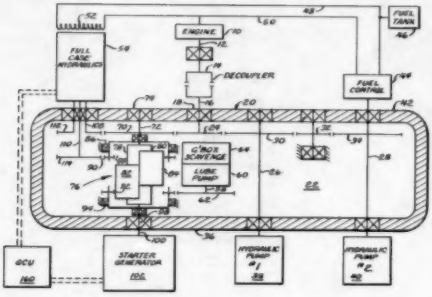
a first housing for said gear box;

an input shaft extending into said first housing and connectable to said power take-off;

a differential within said first housing including a carrier

shaft mounting first and second meshed planet gears, a control ring gear meshed with one of said planet gears and an input/output ring gear meshed with the other of said planet gears, said carrier shaft being coupled to said input shaft;

a second housing containing a hydraulic speed trimmer and mounted on the exterior of said first housing and having two hydraulically interconnected hydraulic pump/motor units, said units each having a shaft entering said first housing and coupled to a respective one of said carrier shaft and said control ring gear, and a displacement control for at least one of said units; and



a third housing containing a starter/generator and mounted on the exterior of said first housing and having a shaft extending into said first housing and coupled therein to said input/output ring gear;

a fuel system drive gear within said first housing and coupled to said input shaft, said fuel system drive gear being operable to drive a fuel pump mounted on the exterior of said first housing;

a heat exchanger including a liquid flow path in heat exchange relation with said hydraulic speed trimmer and said second housing; and

means defining a fuel flow path connected to said pump and including said liquid flow path whereby fuel may serve as a coolant for cooling said hydraulic speed trimmer.

4,713,983

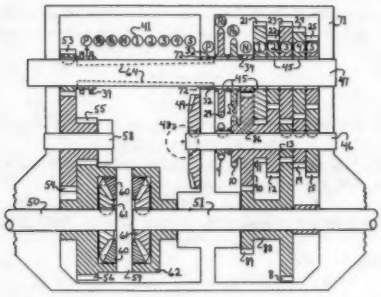
WIDE RANGE TRANSMISSION

Kenneth P. Rundle, 8304 Brookside Rd., Independence, Ohio 44131

Continuation-in-part of Ser. No. 727,834, Apr. 26, 1985, abandoned. This application Jan. 14, 1987, Ser. No. 3,452

Int. Cl.[4] F16H *37/08, 3/08*

U.S. Cl. 74—701 **6 Claims**



1. In a transmission; a housing, an input mainshaft and an output countershaft journalled parallel in said housing, a number of first intermeshing gearsets on said shafts for establishing a number of fast speed drives at respective ratios between said shafts, said fast speed drives having fast speed driver gears nonrotatable on said mainshaft and having respective fast speed driven gears rotatable on said countershaft, and a number of second intermeshing gearsets on said shafts for establishing a number of slow speed drives at respective ratios between said shafts, said slow speed drives having slow speed driver gears all rotatable as one in a first cluster on said mainshaft and having respective slow speed driven gears individually rotatable on said countershaft, and a layshaft supported in said housing parallel to said mainshaft so that said mainshaft is disposed generally between said layshaft and said countershaft, a reduction gear rotatable in a second cluster with a low driver gear on said layshaft, said reduction gear intermeshing with one said fast speed driver gear, said low driver gear intermeshing with a low driven gear rotatable on said mainshaft, said low driven gear being a driving member of said first cluster, clutch means shiftable to drivingly connect said speed driven gears and said countershaft one at a time.

4,713,984

DRIVE STAGE CONTROL MECHANISM FOR AUTOMATIC TRANSMISSION

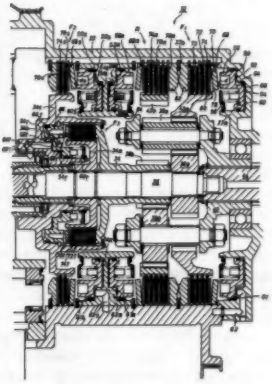
Masahiro Ohkubo, Kadoma, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Filed Jul. 2, 1986, Ser. No. 881,297

Claims priority, application Japan, Jul. 8, 1985, 60-150828

Int. Cl.[4] F16H *47/00*

U.S. Cl. 74—732 **4 Claims**



1. In an automatic transmission providing a planetary gear transmission which carries out a change-over operation of drive stage of plural planetary gear elements by hydraulically engaging and disengaging plural friction elements from a rear stage of a torque converter transmitting an engine power by means of fluid; a drive stage control mechanism for automatic transmission, in which a piston for engagement and disengagement of said friction elements by means of hydraulic force is provided, a pressed surfaces of said piston is formed into plural concentric stepped surfaces, a pressure oil passage port interconnecting with a control valve controlling charge and discharge of hydraulic pressure is provided at any one stage of said plural stepped surfaces, a passage having an orifice and leading the hydraulic pressure from said any one stage to another stage and having a throttling function is provided, and an elastic member effecting a pressure force on a friction element when engaging the friction element is provided between said piston and said friction element, said elastic member have a maximum spring force set larger than a hydraulic pressing load acting on a pressed surface at any stage of said piston to which said hydraulic pressure is first applied.

4,713,985

TRANSMISSION APPARATUS

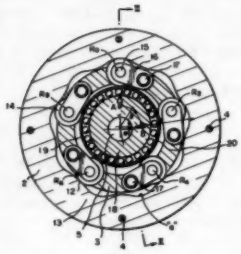
Shimon Ando, Hitachi, Japan, assignor to Kabushiki Kaisya Advance Kaihatsu Kenkyujo, Tokyo, Japan

Continuation of Ser. No. 913,581, Sep. 30, 1986, abandoned, which is a continuation of Ser. No. 739,105, May 30, 1985, abandoned. This application Apr. 6, 1987, Ser. No. 33,870

Claims priority, application Japan, May 31, 1984, 59-112073

Int. Cl.[4] F16H *1/28, 15/50*

U.S. Cl. 74—804 17 Claims



1. A transmission apparatus for changing the rotational speed between a first and a second shaft at a predetermined changing ratio, comprising:

an annular casing having an inner surface;

wave generator means having a cylindrical outer surface fixed to and rotatable with the first shaft;

at least three drive rollers;

carrier means, including first means rotatably mounting each of the drive rollers, connected to and rotatable with the second shaft for rotation within the casing, said first means including second means swingably supporting each of the rotatable drive rollers for permitting constant contact of the drive rollers with the outer surface of the wave generator means and the inner surface of the casing;

the inner surface of the annular casing having teeth with a radial configuration selected to position each of the rollers at the intersection of first and second wave-shaped curves, said curves defining an envelope formed by the teeth on the inner surface of the casing and the outer surface of the wave generator means during rolling movement of the drive rollers on the outer surface of the wave generator means at times when the carrier means and the wave generator means are rotating relative to one another at the predetermined changing ratio, the selected radial configuration being effective to provide constant physical contact of the drive rollers with the outer surface of the wave generator means and the teeth on the inner surface of the casing;

the first curve corresponding to a line passing through the rotational centers of the drive rollers at times when the rollers roll along the teeth on the surface of the casing;

the second curve corresponding to a line passing through the rotational centers of the drive rollers at times when the rollers roll along the outer surface of the wave generator means; and

the second curve having a wave length corresponding to an internal multiple of the wave length of the first curve with both first and second curves having the same amplitude.

4,713,986

HINGE FITTING

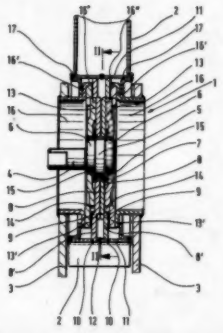
Heinz P. Cremer; Harald Wolsiefer, both of Kaiserslautern; Manfred Hoffmann, Lohnsfeld; Elmar Deegener, Kaiserslautern, and Günter Franzmann, Rockenhausen, all of Fed. Rep. of Germany, assignors to Keiper Recaro GmbH & Co., Fed. Rep. of Germany

Filed Aug. 19, 1986, Ser. No. 898,034

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1985, 3529887

Int. Cl.[4] F16H *1/28*

U.S. Cl. 74—805 13 Claims



1. A hinge fitting for a pivotable connection of the back rest of a vehicle seat with the seat frame or the seat rails in such a manner that the back rest can be locked in a selectable position, said hinge fitting being arranged between the back rest and a pair of spaced plates in said seat frame, comprising first and second fitting elements which are adapted to be pivotably connected with each other by a hinge pin and having a first planetary gearing set, the planetary gear of which is rotatably mounted on an eccentric supported by the hinge pin, said first planetary gearing set meshing with a crown gear forming a first central gear which is rigidly arranged on one fitting element, a second planetary gearing set which is formed as an identical mirror-image of said first planetary gear set relative to a plane perpendicular to the hinge axis, wherein said first and second planetary gearing sets have the same reduction ratio, and the eccentrics of the first and second planetary gearing sets are rotated toward each other at most by a small angle, means for supporting said first central gear and the second central gear around the entire periphery thereof, a structural element surrounding and connected with said first and second planetary gears, means connecting said first and second central gears with said spaced plates in said seat frame, wherein said means for supporting the first and second central gears around the entire periphery thereof is connected with said structural element and is located between said spaced plates in said seat frame.

4,713,987

REDUCTION RATIO CONTROL FOR CONTINUOUSLY VARIABLE TRANSMISSION

Toshio Matsumura, Yokosuka, Japan, assignor to Nisson Motor Co., Ltd., Yokohama, Japan

Filed Apr. 24, 1984, Ser. No. 603,311

Claims priority, application Japan, May 27, 1983, 58-92415

Int. Cl.[4] B60K *41/16*

U.S. Cl. 74—866 2 Claims

1. A control for controlling a reduction ratio in a continuously variable transmission of a vehicle having an engine drivingly connected to the continuously variable transmission, the control comprising:

means for determining a desired reduction ratio within a

predetermined reduction ratio range and generating a desired reduction ratio indicative signal;

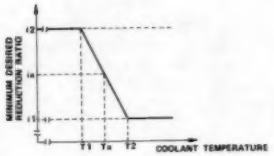
sensor means for sensing engine temperature of the engine and generating a sensor signal indicative of said engine temperature;

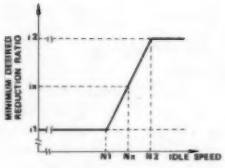
means responsive to said sensor signal for determining a minimum reduction ratio within a minimum reduction ratio range based on possible values of said engine temperature and generating a minimum reduction ratio indicative signal, said determined minimum reduction ratio decreasing as said sensed engine temperature increases;

means responsive to said desired reduction ratio indicative signal and said minimum reduction ratio indicative signal for generating an output signal indicative of said desired reduction ratio indicative signal when said desired reduction ratio indicative signal is greater than said minimum reduction ratio indicative signal and indicative of said minimum reduction ratio indicative signal when said desired reduction ratio indicative signal is not greater than said minimum reduction ratio indicative signal; and

means for adjusting the continuously variable transmission to establish a reduction ratio indicated by said output signal;

wherein said minimum reduction ratio determining means determines the minimum reduction ratio as a maximum reduction ratio achievable in accordance with the construction of the continuously variable transmission when the engine temperature is lower than a first predetermined value, determines the minimum reduction ratio as a minimum value achievable in accordance with the construction of the transmission when the engine temperature is higher than a second predetermined value which is higher than the first predetermined value, and determines the minimum reduction ratio as a reduction ratio which is variable responsive to the engine temperature when the engine temperature is between the first predetermined value and the second predetermined value.





4,713,988

TRANSMISSION CONTROL DEVICE

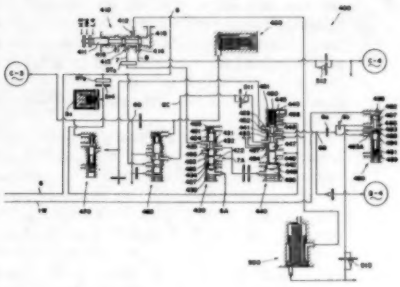
Yoshiharu Harada, Toyota; Yutaka Taga, Aichi; Kagenori Fukumura, Toyota; Yoichi Hayakawa, Toyoake, and Masao Kawai, Chiryu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Aisin-Warner Kabushiki Kaisha, both of Aichi, Japan

Filed Jan. 21, 1986, Ser. No. 820,156

Claims priority, application Japan, Jan. 19, 1985, 60-7763; Jan. 19, 1985, 60-7764

Int. Cl.[4] B60K *41/06*

U.S. Cl. 74—868 6 Claims



1. A transmission control device for a transmission which comprises a main transmission having a plurality of speed changing ratios and a sub transmission connected to the output shaft of the main transmission and having a plurality of speed changing ratios, the transmission control device comprising:

an electronic controller means for receiving outputs from a plurality of sensors capable of sensing a running state of a vehicle and for producing an output indicative thereof;

a main hydraulic controller means and a sub hydraulic controller means for controlling the main transmission and the sub transmission, respectively, in accordance with the output from the electronic controller means, and

wherein the sub hydraulic controller means comprises:

(a) a hydraulic pressure source;

(b) a first hydraulic change-over means connected to the hydraulic pressure source via a line pressure passage;

(c) a second hydraulic change-over means for inhibiting the speed changing operation of the sub transmission in response to a signal from the electronic controller in accordance with the state of running of the vehicle; and

(d) a third hydraulic change-over means connected to the hydraulic pressure source via the line pressure passage, the first hydraulic change-over means via a first hydraulic passage, the second hydraulic change-over means via a second hydraulic passage, a direct-coupling hydraulic passage, and a reduced-speed hydraulic servomotor via a reduced-speed hydraulic passage, and wherein the third hydraulic change-over means comprises:

a first valve means connected to the first hydraulic change-over means via the first hydraulic passage and the second hydraulic change-over means via the second hydraulic passage,

a second valve means connected to the hydraulic pressure source via the line pressure passage, the second hydraulic change-over means via the second hydraulic passage, the direct-coupling hydraulic servomotor via the direct-coupling hydraulic passage, the reduced speed hydraulic servomotor via the reduced speed hydraulic passage, and the first valve means via a third hydraulic passage, and wherein:

the first hydraulic change-over means selectively connects the line pressure passage to the first hydraulic passage according to a manual operation,

the second hydraulic change-over means controls the

charge and discharge of hydraulic pressure to and from the second hydraulic passage in accordance with the vehicle running state,

the first valve means controls the state of communication between the first hydraulic passage and the third hydraulic passage in accordance with the hydraulic pressure in the second hydraulic passage,

the second valve means selectively connects the line pressure passage to at least one of the direct-coupling hydraulic passage and the reduced-speed hydraulic passage in accordance with the hydraulic pressure in the second and third hydraulic passage, and wherein:

the second valve means selectively connects the line pressure passage to one of the direct-coupling hydraulic passage and the reduced-speed hydraulic passage in accordance with the hydraulic pressure in the second hydraulic passage when the line pressure passage is disconnected to the first hydraulic passage by the first hydraulic change-over means, and

the second valve means selectively connects the line pressure passage to one of the direct-coupling hydraulic passage and the reduced-speed hydraulic passage in accordance with the hydraulic pressure in the third hydraulic passage which is selectively connected to the first hydraulic passage in accordance with the hydraulic pressure in the second hydraulic passage when the line pressure passage is connected to the first hydraulic passage by the first hydraulic change-over means.

4,713,989

SHIFT SHOCK SUPPRESSION IN AUTOMATIC TRANSMISSION

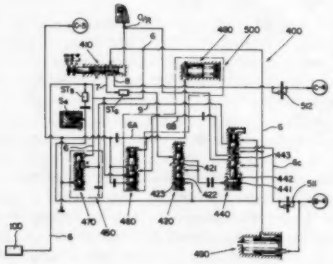
Yoichi Hayakawa, Toyoake; Masao Kawai, Chiryu; Seiichi Nishikawa, Toyokawa, and Kagenori Fukumura, Toyota, all of Japan, assignors to Aisin Warner Limited, Japan

Filed Sep. 23, 1985, Ser. No. 779,252

Claims priority, application Japan, Sep. 28, 1984, 59-204545

Int. Cl.[4] B60K *41/04*

U.S. Cl. 74—869 **5 Claims**



1. A hydraulic control system for an automatic transmission having a main transmission and an auxiliary transmission connected to said main transmission, said control system comprising:

a hydraulic fluid pressure source;

a regulator valve for regulating an output fluid pressure from said source;

a first hydraulic servo for setting said auxiliary transmission in a high speed operating range responsive to said output fluid pressure of said pressure regulator valve;

a second hydraulic servo for setting said auxiliary transmission in a low speed operating range responsive to said output fluid pressure of said pressure regulator valve;

a valve means for selectively supplying said output fluid pressure to one of said hydraulic servos and for draining said output fluid pressure from the other of said hydraulic servos through a first conduit communicating with said first hydraulic servo and a second conduit communicating with said second hydraulic servo;

a check valve-equipped flow control valve in said second conduit for controlling the flow rate of said output fluid pressure supplied to said second hydraulic servo;

a drain conduit connected to said valve means for draining said second hydraulic servo, said drain conduit having an outlet end portion; and,

a shift timing mechanism having a shift timing valve in said drain conduit and a drain orifice located in said outlet end portion of said drain conduit, said shift timing valve comprising a valve body movable between a first position for communicating between said drain conduit and a drain port and a second position blocking communication between said drain conduit and said drain port, said valve body being biased toward said first position by said output fluid pressure supplied to said first hydraulic servo, the shift timing valve being thereby adapted to accelerate drainage of said output pressure from said second hydraulic servo responsive to increases in supply fluid pressure to said first hydraulic servo, whereby shift shock is effectively suppressed.

4,713,990

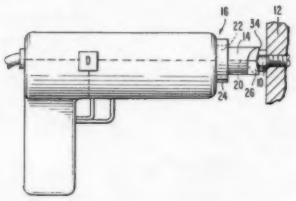
BOLT EXTRACTING TOOL

Denzil C. Poling, Rte. 6, Box 80, Hagerstown, Md. 21740

Filed Jul. 18, 1986, Ser. No. 886,684

Int. Cl.[4] B25B *13/50*

U.S. Cl. 81—53.2 **10 Claims**



1. In combination

(a) a bit for being hammered into bolts for extracting bolts comprising a body having an axis of rotation, the body including a shank end adapted to mate with and rotationally engage a rotatable complementary engaging member of an impact wrench, engagement of which allows forced rotation of the bit by the impact wrench, the body having a toothed end opposite the shank, the toothed end of the bit body having only two bolt-engageable teeth disposed symmetrically about the axis of the body and about a line perpendicular to the axis of rotation of the body at another end of the body opposite the shank end the shank end having an impact surface perpendicular to the axis of rotation of the body for being hammered for driving the biting edge of each tooth into the bolt, each of the teeth of the bit including a biting edge diposed away from the shank end for being driven into a bolt by hammering the shank end and thereby engaging and biting the teeth into a bolt to be extracted, each of the biting edges of the teeth being defined by an acute angle formed between a first planar working face and a second face, said first planar working face being parallel with the body axis for acting against a corresponding surface formed by a hammering the tooth in the bolt for rotating the bolt, said second face extending away from the biting edge of each tooth, said second face passing through and intersecting with a line perpendicular to the first planar working face for allowing the teeth to be hammered into the bolt, each of the biting edges being defined by a peripheral end disposed away from the body axis and an inner portion between the peripheral end and the body axis, the biting edge being

inclined towards the shank end from the peripheral end to the inner portion of the edge for cutting into the bolt and allowing the teeth to be hammered into the bolt; and

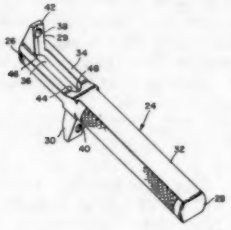
(b) an impact wrench including said rotatable complementary engaging member operatively connected to an impact drive, the engaging member mating with and rotatably engaging the shank end of the body for forced rotation of the bit to extract bolts.

4,713,991

TOOL FOR MANUALLY ROTATING THE STAR WHEEL OF A BRAKE ADJUSTER

Robert T. Gaug, 1476 St. Stephens Church Rd., Crownsville, Md. 21032

Filed Sep. 28, 1982, Ser. No. 425,374
Int. Cl.[4] B25B *13/02*
U.S. Cl. 81—176.1 **7 Claims**



1. A tool for manually rotating the star wheel of a brake adjuster comprising an elongated body having front and rear ends, a first projection on said body adjacent the front end thereof and extending in one direction substantially normal to the axis thereof, a second projection on said body spaced rearwardly of the first projection and intermediate the ends of said body, said projection extending normal to the axis of said body in a direction opposite from said first projection, the spacing between said second projection and the rear end of said body defining a handle, means on each of said projections engageable with a first tooth of a star wheel, first and second abutment means on said body each being on a side of said body opposite a respective projection. and each being abuttingly engageable with a respective second tooth on said star wheel when a projection is engaged with a respective first tooth so as to enable said wheel to be rotated in either direction and with said handle disposed in substantially the same positions relative to the star wheel regardless of the direction in which it is rotated.

4,713,992

PROCESS AND APPARATUS FOR TRUNCATING TUBES

Jean-Paul Languillat, Vallieres Par Thorigny sur Oreuse, France, assignor to Lhomme S.A., Pont sur Yonne, France

Filed May 5, 1986, Ser. No. 859,402
Claims priority, application France, May 6, 1985, 85 06868
Int. Cl.[4] B23B *5/14*
U.S. Cl. 82—48 **7 Claims**

1. An apparatus for truncating a tube positioned on a mandrel and having a free end that moves forwardly in an axial direction and a travelling end comprising:

(a) a mandrel having one end attached to a frame and an opposite free end on which a tube to be cut is mounted;

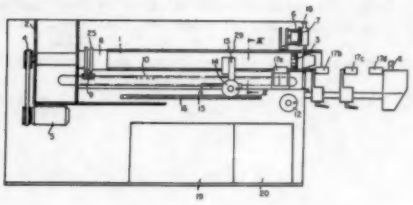
(b) a slide having a forward end coaxially mounted on said mandrel so as to contact said trailing end of the tube;

(c) means to move said slide operably connected to said slide so as to advance the tube axially from said one end towards said free end of of said mandrel;

(d) means for cutting located adjacent said free end of the mandrel;

(e) an abutment for engaging the free end of the tube;

(f) a reference system for determining the distance between said slide and said means for cutting and for controlling



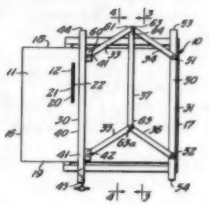
said means to move the slide, said reference system being positioned laterally with respect to said mandrel in communication with said slide.

4,713,993

TABLE SAW GUIDE CONSTRUCTION

Robert H. Litowitz, Old Pump House, Harriman Rd., Irvington, N.Y. 10533

Filed Aug. 6, 1986, Ser. No. 893,868
Int. Cl.[4] B26D *1/00, 3/00, 7/06*
U.S. Cl. 83—34 **3 Claims**

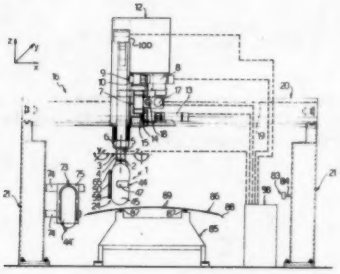


1. An improved guide construction for power driven table saws having a cutting blade moving in a given plane, and a generally horizontally positioned table having an outwardly facing surface perpendicular to the plane of said cutting blade, said construction comprising: first and second elongated guide bars, a pivotally interconnected linkage interconnecting said first and second guide bars for maintaining said bars in mutually parallel relatively movable relation, said linkage including a third centrally disposed elongated bar, and at least four links pivotally interconnected to points on said third bar and one of said first and second guide bars to form a pair of parallelograms; clamping means for selectively clamping an outwardly facing surface of said first guide bar against a planar surface of said cutting blade, clamping means for selectively clamping said second guide bar to said table; and clamping means for selectively clamping said first guide bar to said table; whereby said construction is positioned for guiding a workpiece by first engaging said first member against said blade, moving said second guide bar to desired position on said table, clamping said second guide bar to said table, releasing said first guide bar from engagement against said blade, relocating said first guide bar to appropriate guiding location; and clamping said first guide bar at said last mentioned location to said table.

4,713,994
CUTTING DEVICE FOR SHEETS MADE OF PLASTIC MATERIAL

Giorgio Guglielmetti, Mondovi' ; Guido Carossio, Turin, and Luigi Gilli, Luserna S. Giovanni, all of Italy, assignors to Saint-Gobain Vitrage (Les Miroirs), Courbevoie, France

Filed Jun. 25, 1986, Ser. No. 878,440
Claims priority, application France, Jun. 25, 1985, 85 09627
Int. Cl.[4] B23D *53/00*
U.S. Cl. 83—71 14 Claims



1. An automatic sheet cutting device for cutting transparent or translucent sheets temporarily or permanently assembled with other elements of a pane, by a routing operation, comprising:

a cutting head;

a continuous band saw blade mounted on said cutting head;

means for moving said blade along a path relative to said head;

means for moving said head along three orthogonal cartesian axes;

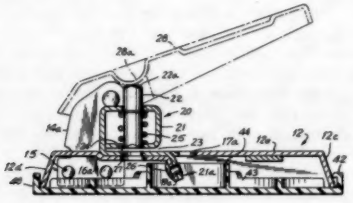
means for rotating said head about two orthogonal axes; and

electronic and numeric control means for controlling said movement and rotation of said head.

4,713,995
HOLE PUNCH ASSEMBLY

Richard A. Davi, Glenwood, N.J., assignor to Rolodex Corp., Secaucus, N.J.

Filed Oct. 3, 1985, Ser. No. 783,677
Int. Cl.[4] B26F *1/02*
U.S. Cl. 83—167 6 Claims



1. A hole punch assembly for punching holes in sheet materials, comprising:

(a) a base member having an upper surface and at least two downwardly folded sides located on opposite sides of the base member and at least one centrally located downward depression and opening provided therein;

(b) at least one spring-loaded punch unit fixedly attached to said base member within said depression and opening in said base member to a bownward extension portion of the depression, said punch unit including a frame folded so as to provide a gap therein adjacent the base member, a punch rod and a compression spring located around the punch rod, and a spring-retaining shoulder ring rigidly attached to the punch rod between the frame and the compression spring upper end, the lower surface of said gap being located flush with the upper surface of the base member;

(c) dual upright supports rigidly attached to the downwardly folded opposite sides of said base member, each said upright support extending upwardly through an opening provided adjacent to two opposite sides of the base member;

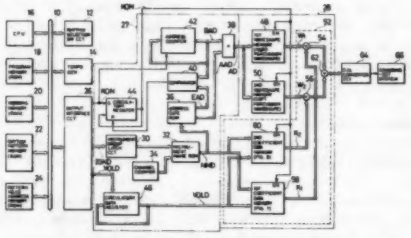
(d) a formed handle pivotally attached to the upper ends of said dual upright supports, said handle having at least one downwardly depressed rib disposed so as to contact the upper end of the punch rod in said punch unit whenever the handle is pressed downwardly; and

(e) a tray member enclosing the lower side of said base member for retaining punched out material chips therein, said tray member being provided with four upwardly flanged sides which enclose the base member downwardly folded sides by projections on the upwardly flanged sides of the tray member, with at least two of said flanged sides, each of which being provided with at least two projections; and being removable from the base member for periodic disposal of the accumulated chips.

4,713,996
AUTOMATIC RHYTHM APPARATUS WITH TONE LEVEL DEPENDENT TIMBRES

Shigenori Oguri, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Mar. 6, 1986, Ser. No. 836,840
Claims priority, application Japan, Mar. 11, 1985, 60-47667
Int. Cl.[4] G10H *1/08, 1/40, 7/00*
U.S. Cl. 84—1.03 10 Claims



9. An automatic rhythm apparatus, comprising:

first and second waveshape memory means storing first and second waveshapes, respectively, wherein the first waveshape corresponds to plural cycles of the tone produced by a percussion instrument when struck with a first strength and the second waveshape corresponds to plural cycles of the tone produced by said percussion instrument when struck with a second strength which is different from the first strength;

tone command signal generating means for generating tone command signals designating the timings and volumes of different tones to be produced;

reading-out means connected to said first and second waveshape memory means and to said tone command signal generating means for reading out the first and second waveshapes in parallel fashion at timings designated by the tone command signals; and

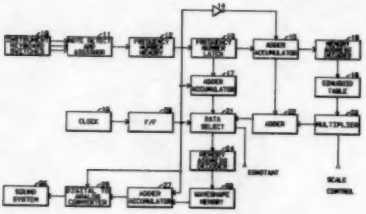
mixing means for mixing the first and second waveshapes in accordance with the volume designated by the tone command signal for each tone, thereby to provide different output waveshapes corresponding to different volumes.

4,713,997

DUAL MODE MUSICAL TONE GENERATOR USING STORED MUSICAL WAVEFORMS

Ralph Deutsch, Sherman Oaks, Calif., assignor to Kawai Musical Instrument Mfg. Co., Ltd, Hamamatsu, Japan

Filed Jul. 18, 1986, Ser. No. 886,710
Int. Cl.[4] G10H *1/08, 7/00*
U.S. Cl. 84—1.22 13 Claims



1. In combination with a keyboard operated musical instrument having an array of keyswitches, apparatus for producing a dual musical tone comprising;

an assignor means whereby a detect data word is generated in response to each actuated keyswitch in said array of keyswitches and one of a plurality of tone generators is assigned to each actuated keyswitch and whereby a corresponding detect data word is provided to the corresponding said assigned tone generator; and

said plurality of tone generators each of which comprises,

a frequency number generator means whereby, a frequency number is generated corresponding to said detect data word provided to said corresponding assigned tone generator,

a waveshape memory for storing a preselected set of waveshape data words,

a memory addressing means whereby said preselected set of waveshape data words are read out sequentially from said waveshape memory at a memory address advance rate response to said generated frequency number,

a dual memory addressing means whereby said preselected set of waveshape data words are read out sequentially from said waveshape memory at a time variant memory advance rate,

a select means for selectively reading out waveshape data words from said waveshape memory alternately in response to said memory addressing means and in response to said dual memory addressing means,

a combination means for combining waveshape data words read out from said waveshape memory by said memory addressing means and by said dual memory addressing means to form a sequence of composite waveshape data words, and

a conversion means for producing said dual musical tone responsive to said sequence of composite waveshape data words.

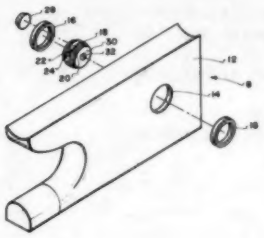
4,713,998

BOW FROG

Sidney Weiss, 331 N. Lucerne Blvd., Los Angeles, Calif. 90004

Filed Mar. 26, 1987, Ser. No. 30,331
Int. Cl.[4] G10D *3/16*
U.S. Cl. 84—282 5 Claims

1. A frog for musical instruments comprising a base portion, an aperture extending transversely through said base portion, a cylinder rotatably positioned within said aperture having means located generally centrally of said cylinder for releasably retaining the knotted end of a hair band, means for rotating said cylinder within said aperture to wind said hair band onto or off of said cylinder to adjust the tension of said hair



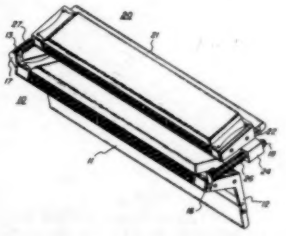
band, and means of releasably locking said cylinder in a desired position within said aperture.

4,713,999

DUAL HARMONICA ARRAYS AND HARMONICA RECEPTACLES

Raymond J. Burt, 30 3rd St., Waterford, N.Y. 12188

Filed Jun. 5, 1986, Ser. No. 870,798
Int. Cl.[4] G10G *5/00*
U.S. Cl. 84—379 19 Claims



1. A dual harmonica receptacle comprising (A) a first immovable harmonica receptacle section for holding a first harmonica in a lower forward position comprising a handle, terminal handle brackets having inwardly facing rectangularly hollow grooved forward head sections and superimposed on each of the forward head sections of the terminal handle brackets, an inwardly facing slotted super structure, (B) a second movable upper harmonica receptacle section for holding a second harmonica in an upper rear position having a handle and terminal brackets with inwardly facing rectangularly grooved sections and exterior fixed riders sized to fit within and override the inwardly facing slots of the super structures of the terminal handle brackets of (A) and (C) means for altering the relative positions of the receptacle sections of (A) and (B).

4,714,000

PICCOLO FLUTE

Anton J. Braun, Mainzer Strasse 21, 6073 Egelsbach, Fed. Rep. of Germany

Filed Jan. 29, 1986, Ser. No. 823,530
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, 3502842
Int. Cl.[4] G10D *7/02*
U.S. Cl. 84—384 8 Claims

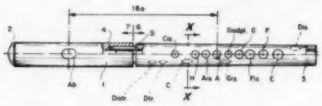
1. A piccolo transverse flute of the "Orchestra Boehm flutes" family comprising:

a head part with a mouth hole or embouchure hole and a closure cap with an adjustable seal on its free frontal side;

a body part with finger holes, said body part further comprising a hole setting scheme for a concert pitch a'=440

Hz wherein distances between the individual centers of finger holes from a center of a finger hole A in mm are approximately:

G sharp (A flat) dpl: 10.60
G sharp (A flat): 12.00
G: 23.20
F sharp (G flat): 35.50
F: 50.20
E: 66.00
D sharp (E flat): 80.20



D (terminal hole): 105.50
D sharp (E flat) tr.: 64.80
Dtr: 52.80
C sharp (D flat): 48.50
C: 32.20
B: 22.50
A sharp (B): 12.00

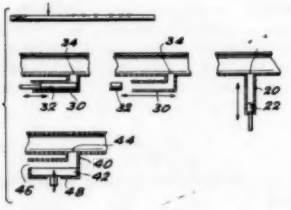
wherein a terminal finger hole is located on its free frontal side, and wherein the body part exhibits only one C hole (C).

4,714,001

DEVICE FOR OBTAINING QUARTER-TONES AND OTHER MICRO-INTERVALS ON MUSICAL WIND INSTRUMENTS WITH LATERAL HOLES

Jean Kergomard, Coulans sur Gee, and Xavier Meynial, Gif sur Yvette, both of France, assignors to Centre National de la Recherche Scientifique and Institut de Recherche et de Coordination Acoustique Musique IRCAM, both of Paris, France

Filed Sep. 19, 1986, Ser. No. 909,333
Int. Cl.[4] G10D *7/00*
U.S. Cl. 84—386 **7 Claims**



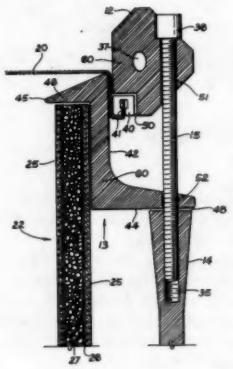
1. A device for obtaining quarter-tones and other micro-intervals on musical wind instruments with lateral holes, comprising for each register of the instrument at least one auxiliary tube branched in the vicinity of the instrument head, said at least one auxiliary tube having a first end in contact with said instrument and a second open end, and a manual control mechanism comprising means to selectively block each said at least one auxiliary tube adjacent said first end and to selectively open the second end.

4,714,002

PERCUSSION MUSICAL INSTRUMENT DRUM-HEAD SKIN TENSIONING ASSEMBLY AND DRUM SHELL CONSTRUCTION THEREFOR

Terry P. Cleland, 1769 Woodview Avenue, Pickering, Ontario, Canada

Filed Mar. 11, 1986, Ser. No. 838,328
Claims priority, application Canada, Mar. 13, 1985, 476373
Int. Cl.[4] G10D *13/02*
U.S. Cl. 84—413 **1 Claim**



1. A drum head skin tensioning assembly comprising in combination;

inner and outer hoop rings, said inner ring being essentially L-shaped in cross sectional view and comprised of a vertical flange, an outwardly directed foot-flange and an inwardly directed drum stop flange on the upper edge of said vertical flange, said outer ring overlapping the upper portion of said inner hoop ring;

an annular step formed in the lower inner edge of said outer ring to accommodate a locking hoop, said drum skin being secured between said locking hoop and said annular step;

means co-acting with said rings for varying the tension of said skin by varying the extent of overlap between said rings;

a drum shell, said inwardly directed stop flange being adapted to abut an upper perimeter edge of said drum shell;

said inwardly directed drumstop flange being held in abutment with the upper perimeter of said drum shell by the tensioning means being secured to a second outer hoop ring adapted to maintain another drum skin in abutting force against a lower perimeter edge of said drum shell, said drum shell being of cylindrical configuration;

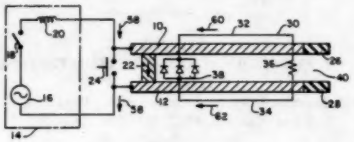
a tension varying means in the form of a set of aligned apertures in said outer ring of said foot flange, and threadable cap screws extending through said set of apertures for torquing down the assembly in overlapping position after the drum has been set in abutment with the inner ring stop flange and the second upper hoop has been tensioned to mate with the lower drum head skin against the lower part of the drum shell perimeter edge;

said drum shell being composed of a cylinder made from a sheet of rigid foam spaced between and attached by epoxy cement to sheets of woven carbon fibres overlying both sides of said rigid foam sheet and abutting together along a line in a mould to provide a cylindrical shape when said line is fastened together by an epoxy cement seam.

4,714,003
ELECTROMAGNETIC LAUNCHER WITH A PASSIVE INDUCTIVE LOOP FOR RAIL ENERGY RETENTION OR DISSIPATION

George A. Kemeny, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 19, 1985, Ser. No. 702,771
Int. Cl.[4] F41F *1/02*
U.S. Cl. 89—8 17 Claims

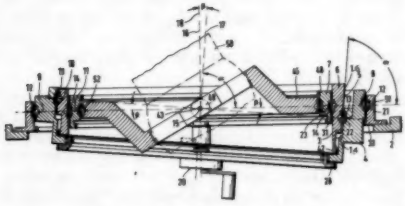


1. An electromagnetic projectile launcher comprising:
a pair of conductive rails, having a breech end and a muzzle end;
a source of electric current;
means for switching current from said current source to said rails;
means for conducting current between said rails and for propelling a projectile along said rails;
means for electrically insulating;
a first conductive loop which is electrically insulated by said insulating means from said rails and inductively coupled to said rails to link magnetic flux produced between said rails by current flowing through said rails; and
means for controlling current flow in said conductive loop.

4,714,004
APPARATUS FOR HORIZONTALIZATION OF REVOLVABLE WEAPON PLATFORM

Udo Weinfurth, Düsseldorf, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 23, 1985, Ser. No. 779,204
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1984, 3436081
Int. Cl.[4] F41F *23/06*
U.S. Cl. 89—37.09 3 Claims



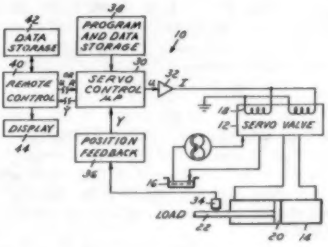
1. An apparatus to horizontalize a revolvable weapon platform, which, in order to compensate for lateral tilt and inclined position, relative to a stationary basis, is mounted on the gun-carriage of a vehicle, as an intermediate carrier for a weapon turret, which comprises: two ring shaped hollow bodies that are connected for common and mutually opposed rotatory movement, the facing lateral surfaces of the said hollow bodies running parallel and forming inclined planes facing a bearing surface of the first hollow body which is fixed preferably in the vehicle body, one side of the second hollow body comprising a horizontalizable receiving surface for the weapon platform, whereby a swing axis of the weapon platform assumes a horizontal position when both hollow bodies assume a mutually turned position, and the weapon platform simultaneously assumes a horizontally but oppositely directed turned position to the hollow bodies, around the swing axis, characterized thereby

that the weapon platform is arranged within the radial inner region of the hollow body enclosed in the first hollow body; and the first hollow body is arranged within the radial inner region of the vehicle body; and a two-ply steep angle roller bearing is arranged between the weapon platform and the second hollow body, between the first hollow body and the vehicle roof, and between the first and second hollow bodies; whereby the axes of rotation, respective to each two-ply steep angle roller bearing, as well as the operative surfaces of the bearings vertical to the axes of rotation, intersect at a point with a turret axis of a barrel weapon arranged on the weapon platform; and that furthermore the hollow bodies are form locked connected with the platform via a reversing gear coupled to a horizontalizing gear, so that the during rotatory movements of the hollow bodies required for horizontalization, the direction of the platform remains unchanged in its peripheral direction by means of the reversing gear.

4,714,005
POWER TRANSMISSION

Richard S. Leemhuis, Troy, Mich., assignor to Vickers, Incorporated, Troy, Mich.

Filed Jul. 28, 1986, Ser. No. 889,617
Int. Cl.[4] F15B *13/16;* F17D *3/00*
U.S. Cl. 91—361 12 Claims



1. In an electrohydraulic servo system which includes a servo valve for variably feeding hydraulic fluid from a source to a load, means coupled to the load for providing signals as a function of motion at the load, means for selectively providing command signals, and servo control means responsive to said command signals and to said motion signals for controlling fluid flow at said valve as a continuing function of said command signals between flow limits, a method of measuring fluid flow characteristics at said valve comprising the steps of:
(a) generating a preselected raw flow command signal and feeding said raw flow command signal to said servo control means,
(b) measuring said motion signal indicative of motion at the load and determining velocity of motion at said load obtained responsive to said preselected raw flow command signal,
(c) repeating said steps (a) and (b) for a plurality of differing raw flow command signals, and
(d) storing velocity at said load determined in said step (b) as a function of corresponding raw flow command signals generated in said step (a).

4,714,006

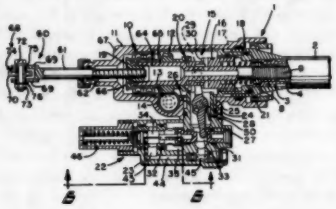
FLUID ACTUATOR WITH FEEDBACK MECHANISM

James N. Tootle, Kalamazoo, and Eugene J. Martin, Portage, both of Mich., assignors to Pneumo Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 352,046, Feb. 24, 1982, Pat. No. 4,463,057. This application Jul. 29, 1982, Ser. No. 403,012

Int. Cl.[4] F01B *25/26*

U.S. Cl. 92—5 R 19 Claims



1. A fluid actuator comprising a cylinder, a piston axially movable within said cylinder, a rotatable member operatively connected to said piston such that axial movement of said piston causes rotation of said rotatable member, and linear feedback means driven by said rotatable member for indicating the position of said actuator, said feedback means including an output member whose movements are proportional to the rate of movement and position of said piston, said feedback means including a feedback screw having a threaded connection with said rotatable member, and means for restraining said feedback screw against rotation, whereby rotation of said rotatable member will cause axial movement of said feedback screw, said means for restraining said feedback screw against rotation comprising a linkage mechanism, said linkage mechanism comprising a first lever to which said feedback screw is connected to prevent rotational movement of said feedback screw laterally relative to said first lever, and a second lever connecting said first lever to said actuator preventing lateral movement of said levers relative to said actuator.

4,714,007

SHUTTLE PISTON CYLINDER

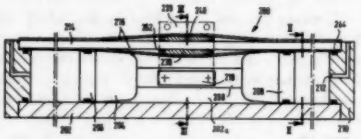
Dieter Maisch, Fellbach, Fed. Rep. of Germany, assignor to Herion-Werke KG, Fellbach, Fed. Rep. of Germany

Filed Mar. 18, 1986, Ser. No. 841,091

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509891

Int. Cl.[4] F01B *29/00*

U.S. Cl. 92—88 14 Claims



1. A shuttle piston cylinder device, comprising:

a cylinder defining an axis and having a cylinder barrel provided with a longitudinal slot extending in axial direction thereof;

a piston reciprocating in axial direction within said cylinder;

a transmission element connected to said piston and projecting through said slot for transmitting the movement of said piston; and

a one-piece sealing band permanently anchored within said slot and provided with two spaced flexible inner and outer sealing lips lying against said cylinder barrel for sealing said slot towards the inside of said cylinder as well as towards the exterior, said sealing lips being liftable off said cylinder barrel by said transmission element without moving said sealing band from said slot, said transmission element being a bracket having a double bend extending between said sealing lips to lift the latter from said cylinder barrel and including a web extending essentially radially through said longitudinal slot and two shanks connected to said web at its respective ends and extending slantingly away from said sealing band, said sealing lips lying on said shanks when being lifted.

4,714,008

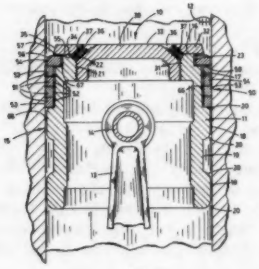
PISTON FOR INTERNAL COMBUSTION ENGINES AND THE LIKE

Walter B. Bowers, 6046 N. Remington St., Fresno, Calif. 93704

Filed Nov. 21, 1985, Ser. No. 800,448

Int. Cl.[4] F16J *1/04*

U.S. Cl. 92—219 8 Claims



1. A piston for operation within a cylinder and wherein the cylinder has an internal cylinder wall the piston comprising:

a piston body having a primary cylindrical surface with a diameter substantially conforming to the interior diameter of said cylinder, the primary cylindrical surface composed of a pair of annular portions having diameters substantially conforming to the interior diameter of the cylinder with an annular recess interposed between the annular portions of said pair of annular portions, said piston body further having a first end and a secondary surface of smaller diameter than said diameter of the primary cylindrical surface disposed axially of the piston body betweeen the primary cylindrical surface and the first end;

a cap having a surface adapted for exposure to a fluid within the cylinder;

at least one piston ring disposed in an operational position substantially concentrically of and about said secondary surface of the piston body, and an annular space extends about the piston between the piston ring and the primary cylindrical surface operable to receive oil in operation and to carry said oil along the cylinder wall to enhance lubrication; and

means releasably mounting the cap on the first end of the piston body capturing the piston ring in said operational position.

4,714,009

CEILING AIR DIFFUSER

Marvin L. DeHart, Mesquite, and Dale B. Johnson, Garland, both of Tex., assignors to Philips Industries Inc., Dayton, Ohio

Filed Aug. 4, 1986, Ser. No. 892,292

Int. Cl.[4] F24F *13/06*

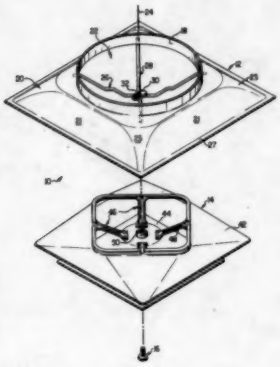
U.S. Cl. 98—40.13 6 Claims

1. An air diffuser for diffusing conditioned air from a duct to a room, comprising:

a base having an inlet portion for attachment to the duct, an

air passage having a center line being defined through the base for flow of the conditioned air therethrough when the base is connected to the duct;

a cone assembly for diffusing air passing through the air passage in the base into the room when positioned in a selected orientation to the base;



said base including a cone assembly suspension being formed by at least one rod extending into the air passage to proximate the center line;

means for attaching said cone assembly to said suspension at a single point; and

a cone alignment assembly comprising a channel formed on the cone assembly to receive a portion of said rod to align the cone assembly with the base.

4,714,010

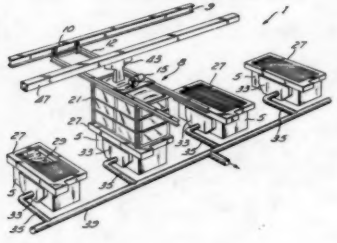
INDUSTRIAL EXHAUST VENTILATION SYSTEM

W. James Smart, Newport Beach, Calif., assignor to CM & E/California, Inc., Santa Ana, Calif.

Filed Apr. 12, 1985, Ser. No. 722,777

Int. Cl.[4] B05C *3/02*; B08B *15/02*

U.S. Cl. 98—115.4 **2 Claims**



1. An industrial ventilation system comprising:

a cover assembly having a reciprocating cover supported by an outer cover frame, said cover having a closed position and an open position and means for moving said cover between said open and closed position;

a source of industrial exhaust gases emanating from a structure that receives said reciprocating cover assembly, with said source of exhaust gases separated from the surrounding environment when said cover is in the closed position, and access to the source is provided when said cover is in the open position;

at least one exhaust opening formed in said outer cover frame, said exhaust opening providing an air passageway for the industrial exhaust gases through said cover assembly regardless of the cover position;

an exhaust collector means communicating with said air passageway;

a workload enclosure received by said cover assembly, forming a fume containment region therewith when the reciprocating cover is in an open position;

means for moving said workload enclosure, permitting the selective engagement and disengagement of the enclosure with said cover assembly; and

a hoist for carrying a workload attached to said workload enclosure in a manner wherein the workload is carried within and surrounded by the workload enclosure prior to the engagement of said workload enclosure with the cover assembly,

whereby a workload can be brought to the cover assembly and thereafter lowered by the hoist through the open cover while simultaneously containing the exhaust gases within the fume containment region.

4,714,011

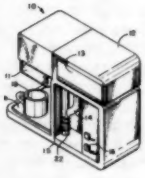
PORTABLE BEVERAGE BREWING APPARATUS

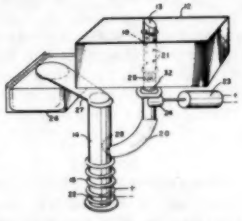
Binh T. Ly, 1101 NW. 52nd St., #2, Ft. Lauderdale, Fla. 33309

Filed Oct. 20, 1986, Ser. No. 920,376

Int. Cl.[4] A47J *31/00, 31/30*

U.S. Cl. 99—279 **9 Claims**





1. A beverage brewing apparatus comprising:

a housing, said housing having an open-top container adapted to receive therein a quantity of water, said open-top container having an opening at the bottom thereof for draining water therefrom by gravity;

puncturing means at the bottom of said open-top container, said puncturing means adapted to puncture a puncturable water container;

a reservoir having a pair of openings below said open-top container for receiving water from said open-top container;

first conduit means associated with said open-top container and connected to one of said reservoir openings for conveying water into the reservoir;

first electric heating means associated with said reservoir for heating and transforming the water in said reservoir into steam;

a removable insert container receivable within said housing for storing ingredients necessary to brew a beverage; and,

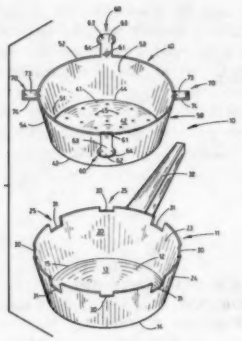
second conduit means associated with said insert container and said other reservoir opening for directing said steam from said reservoir to said beverage making ingredients.

4,714,012

COOKING VESSEL WITH AN INNER HEAT CONDUCTIVE JACKET AND THE LIKE

Rosalio A. Hernandez, 1138 W. Cambridge Ave., Fresno, Calif. 93705

Filed Sep. 15, 1986, Ser. No. 906,930
Int. Cl.[4] A47J *37/12*
U.S. Cl. 99—444 **5 Claims**



1. A cooking vessel which permits the transmission of heat energy to a food product being processed, comprising:

an outer heat conductive jacket of predetermined dimension, said outer jacket having a substantially vertical side wall, a top edge and a bottom surface, said side wall having formed therein a multiplicity of vertically disposed slots of varying length that extend downwardly from the top edge; and

an inner heat conductive jacket conformably dimensioned for substantially close telescoping receipt internally of the outer heat conductive jacket, the inner jacket having a substantially vertical nonporous side wall of substantially uniform height, a top edge, and a bottom surface, the top edge mounting a pair of handles and a pair of stabilizing bars, said handles and stabilizing bars adapted to mate with the multiplicity of vertical slots formed in the side wall of the outer jacket, the bottom surface of said inner jacket having formed therein a multiplicity of small drainage holes that permits a liquid to pass therethrough.

4,714,013

COLLAPSIBLE COOKING UNIT

Terrence D. Telfer, 64 NW. Portland Ave., Bend, Oreg. 97701

Filed Nov. 26, 1986, Ser. No. 935,275
Int. Cl.[4] F24C *1/16*; B65D *6/12*
U.S. Cl. 99—449 **7 Claims**

1. A heating unit for consumables comprising:

(a) a hollow vessel comprising a plurality of adjacent pairs of confronting side panels, each of said panels having a side edge and a bottom edge, each side panel of one of said pairs of said panels having adjacent sections, said adjacent sections of each side panel of said one pair of side panels having adjacent edges parallel to the side edges of said panels;

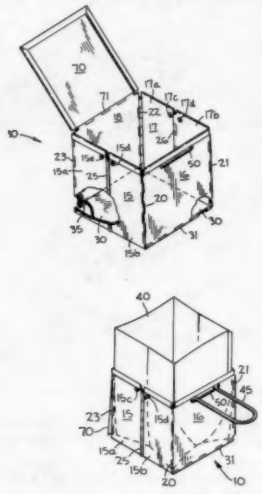
(b) first hinge means hingedly connecting adjacent side edges of said side panels for folding and extending said hollow vessel;

(c) second hinge means hingedly connecting adjacent sections of each side panel of said one pair of side panels for folding and extending said hollow vessel,

(d) a bottom panel hingedly connected to the lower edge of a side panel other than the side panels of said one pair of said panels and engaging the bottom edges of said side panels other than the bottom edge of said side panel to which it is hingedly connected for forming a bottom wall for said hollow vessel,

(e) a cover panel hingedly connected to the upper edge of a side panel that confronts the side panel to which said bottom panel is hingedly connected;

(f) said one pair of said panels being formed with an upper section and with confronting openings in the upper section thereof; and



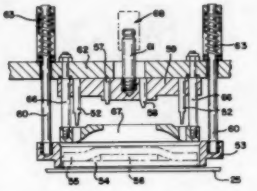
(g) a handle with free ends removably insertable in said openings and pivoted within said openings, said handle including a central section between said free ends arranged for suspending said hollow vessel.

4,714,014

AUTOMATIC CRIMPING MECHANISM FOR PROTEINACEOUS PATTIES

Carroll P. Hartl, and James M. Heitman, both of Madison, Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Feb. 25, 1986, Ser. No. 833,637
Int. Cl.[4] A22C *17/00*
U.S. Cl. 99—450.2 **16 Claims**



1. An apparatus for knitting layers of proteinaceous patties together, comprising:

conveyor means for longitudinally transporting a product at a predetermined rate, the product including a plurality of proteinaceous patties;

crimper means having a crimper assembly including a crimper head with a plurality of projections for entering the proteinaceous patties wherein said crimper assembly rotates in a generally arcuate path in a substantially vertical plane with respect to the conveyor means, which is substantially horizontally oriented, wherein the crimper means includes actuation means for moving the plurality of projections of projections with a back and forth motion, wherein said crimper head includes an outer ring member

that generally engages and moves with a belt of said conveyor means during crimping, and said crimper head further includes a plurality of pins inwardly spaced from the periphery of said outer ring, and wherein said outer ring is mounted for generally upward movement thereof upon its engagement with the belt; and

camming means for generally downwardly positioning said crimper head into engagement with the proteinaceous patty product while same is conveyed by said conveyor assembly generally under said crimper assembly, said camming means further being for moving said crimper head to correspond to said predetermined rate of the conveyor means once the engagement between said crimper head and the proteinaceous patty product has been attained, and said camming means also being for generally upwardly withdrawing said crimper head from its said engagement with the proteinaceous patty product after crimping has been completed;

whereby said plurality of proteinaceous patties of the product are knitted together while the product is being longitudinally transported by said conveyor assembly.

4,714,015

SEALING ARRANGEMENT FOR A MEDIUM-CONTAINING CHAMBER OF A DUAL BELT PRESS

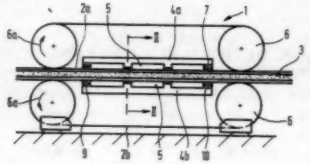
Gerhard Stäbler, Murr, Fed. Rep. of Germany, assignor to Santrade Ltd., Lucerne, Switzerland

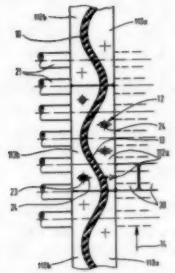
Filed Jun. 24, 1986, Ser. No. 878,022

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1985, 3525154

Int. Cl.⁴ B30B *5/04*

U.S. Cl. 100—154 **10 Claims**





1. In a dual belt press of the type comprising opposed movable belts and means defining a chamber disposed adjacent one of said belts for containing a medium to be applied to said one belt, said chamber-defining means including a frame, and sealing means for sealing said medium in said chamber, said sealing means comprising first sealing portions extending generally parallel to the direction of belt travel and second sealing portions extending transversely of the direction of belt travel, at least said first sealing portions each comprising:

holder means attached to said frame and defining a serpentine groove extending generally in the direction of belt travel and being disposed generally in a plane, said holder means comprising separate ledges disposed on opposite sides of said groove and defining said groove, each said ledge comprising a plurality of pieces abutting each other in the direction of belt travel, pieces on opposite sides of said groove being displaceable in a direction transverse to the direction of belt travel and parallel to said plane of said groove, and

a sealing strip mounted in said groove so as to be of serpentine configuration generally in the direction of belt travel, said strip being insertable in said groove means with said ledges mutually separated and secured in response to said ledges being brought together.

4,714,016

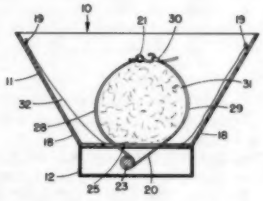
BUNDLING APPARATUS WITH FLEXIBLE ROPE TYPE COMPRESSOR

Joseph N. Bond, 28 Sarina Dr., Commack, N.Y. 11725

Filed Nov. 10, 1986, Ser. No. 929,742

Int. Cl.⁴ B30B *5/04*

U.S. Cl. 100—212 **17 Claims**



1. An arrangement for bundling elongated flexible elements, comprising

means for supporting a plurality of the elements to be bundled with substantially the same orientation;

an elongated torque member mounted on said supporting means for rotation about an axis;

means for rotating said torque member, including a hand crank mounted on said torque member for joint rotation therewith;

at least one elongated flexible bundling member having two end portions with effective lengths that are at least sufficient for said end portions jointly to surround said plurality of the elements to be bundled, and a central portion interconnecting said end portions and connected to said torque member for becoming wound around said torque member during the rotation thereof with attendant simultaneous reduction in said effective lengths of said end portions; and

means for connecting said end portions of said bundling rope with one another for said end portions to compress said elements into a compact bundle as said effective lengths of said end portions are being reduced.

4,714,017

PYROTECHNIC VARIABLE DELAY CONNECTOR

George G. Kelly, Hawkesbury; Henry McLaughlin, Brownsburg, and James R. Simon, Lachute, all of Canada, assignors to CXA Ltd./CXA LTEE, Brownsburg, Canada

Filed May 4, 1987, Ser. No. 45,407

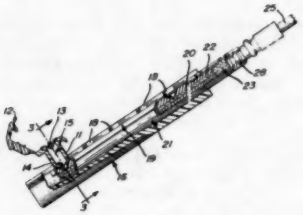
Claims priority, application Canada, Sep. 26, 1986, 519148

Int. Cl.⁴ C06C *5/64*

U.S. Cl. 102—275.3 **7 Claims**

1. A pyrotechnic delay connector adapted for initiating a detonation wave in an acceptor cord at a variable time interval after said connector receives a shock wave for a donor device, said time interval being adjustable at the blast site and wherein said connector consists essentially of an elongated, hollowed-out body comprising a first attachment means for firmly hold-

ing said donor device, an exothermically burning delay composition located within said hollowed-outed out body, an explosive transfer charge abutting said delay compositon and second attachment means for firmly holding said acceptor detonating cord in initiation relationship with said transfer charge and characterized in that said elongated hollowed-out body has a



plurality of lightly sealed notches extending from the surface of the body to expose to initiation the delay composition, said notches being spaced at a variety of distances from said transfer charge and said first attachment means being adapted to bring said donor detonating cord into initiation relationship over a selected one of said notches.

4,714,018

METHOD AND MEANS FOR CONNECTING FUSES

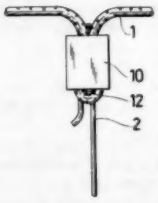
Lars-Gunnar Löfgren, Nora, Sweden, assignor to Nitro Nobel AB, Gyttorp, Sweden

Filed Jun. 30, 1986, Ser. No. 880,020

Claims priority, application Sweden, Jul. 1, 1985, 8503278

Int. Cl.[4] C06C *5/04*; F41D *1/04*

U.S. Cl. 102—275.7 **19 Claims**



8. A method for transmitting a signal from a detonating cord to a shock wave initiable low energy fuse comprising the steps of:

forming a fold in the cord so that two halves of the fold extend away from the length of the cord adjacent the fold;

positioning a length of the fuse within signal receiving distance of both fold halves; and

initiating the cord.

4,714,019

INSERTS FOR COATING AN EXPLOSIVE CHARGE, AND FORMING A ROD-SHAPED PROJECTILE, AND PROCESS FOR MANUFACTURE OF INSERTS

Hendrik Lips, and Joerg Peters, both of Duesseldorf, Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 16, 1986, Ser. No. 886,903

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 3525613

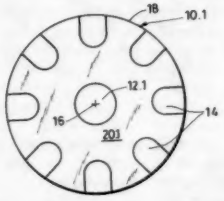
Int. Cl.[4] F42B *1/02*

U.S. Cl. 102—307 **8 Claims**

1. A liner, essentially of the form of a hollow spherical cap or calotte, for being arranged on the shaped front of an explosive charge, preferably of a projectile, said liner being earmarked for being collapsingly shaped on the explosion of said explosive charge in order to form a rod shaped projectile with rear end flaring out which allows for the aerodynamic stabilization of said rod shaped projectile, said liner comprising:

zones which are symmetrically arranged to the center of said liner,

said zones having mechanical properties which differ from



the mechanical properties of the region neighboring said zones,

said difference of said mechanical properties resulting in a predetermined dynamic behavior of the material forming said liner such, that said behavior satisfies the demands which are set by said aerodynamic stabilization of said rod shaped projectile.

4,714,020

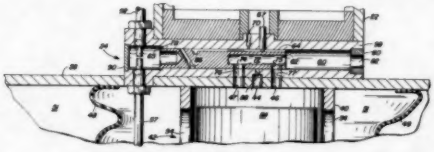
ENABLING DEVICE FOR A GAS GENERATOR OF A FORCED DISPERSION MUNITIONS DISPENSER

John P. Hertsgaard, Minneapolis, and W. Keith Gallant, Plymouth, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 30, 1987, Ser. No. 8,692

Int. Cl.[4] F42B *4/06*

U.S. Cl. 102—351 **20 Claims**



1. An enabling device **24** for a pyrotechnic gas generator **42**, said device having two states, a disabled state and an enabled state, said device comprising:

a housing **58**;

detonator means **70** mounted in the housing **58** for producing a detonation responsive to a fire signal;

said device **24** in its disabled state having means for venting **64**, **60**, **82** the products of the detonation of the detonator **70** to the environment exterior of the housing **58**, and means for venting **46**, **47**, **76**, **77**, **74**, **75**, **72**, **60** and **82** gases produced by a gas generator **42**, to the environment exterior of the housing **58**;

said device **24** in its enabled state including means forming an uninterrupted firing train **86**, **88**, **44**, between the detonator means **70** and gas generator **42** for initiating the release of gas from the gas generator **42**; and

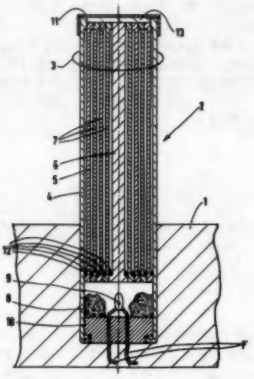
means responsive to a signal **57** for causing the enabling device **24** to change from its disabled state to its enabled state.

4,714,021

BURIED SYSTEM COMPRISING A SIGNALIZATION DEVICE

Jean-Pierre Tranin, Fontenay Aux Roses, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 16, 1986, Ser. No. 864,167
Claims priority, application France, May 21, 1985, 85 07608
Int. Cl.[4] F42B *23/24*
U.S. Cl. 102—401 6 Claims



1. A buried system with a primary operation comprising a signalization device including a telescopic arrangement of a plurality of coaxial tubes and comprising means for increasing the internal pressure in order to develop the telescopic arrangement, means for controlling the increase of the internal pressure from a predetermined instant, means for providing a seal between each tube and its adjacent outer tube thereby providing tightness to the telescopic arrangement and means for ensuring the maintenance of tightness during the development of the telescopic arrangement, said means for providing tightness to the telescopic arrangement being toric joints or rings disposed around the coaxial tubes and said means for ensuring the maintenance of tightness within the telescopic arrangement being a washer, which is fixed at the top of the central coaxial tube and whose edges bear on the top of the outer coaxial tube.

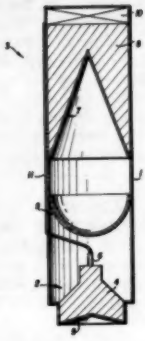
4,714,022

WARHEAD WITH TANDEM SHAPED CHARGES

Alain Chaumeau, Levet; Eric Crotet, Mehun sur Yevre; Alain Kerdraon, and Jean-Paul Ragonnet, both of Bourges, all of France, assignors to Etat Francais, Paris, France

Filed Sep. 4, 1985, Ser. No. 772,463
Claims priority, application France, Sep. 5, 1984, 84 13633
Int. Cl.[4] F42B *3/08*
U.S. Cl. 102—476 9 Claims

1. An armor-defeating warhead of the type intended for attack against an active armored target, comprising a forward shaped charge, a rearward shaped charge, means for mounting said forward and rearward charges in tandem, and delay timing means for imparting an activation delay in the detonations of said charges from the forward to the rearward charge; wherein said forward charge is provided with a metallic liner having an average thickness substantially between 1 and 2 percent of the diameter of said forward charge, so as to generate, when detonated, an explosive core having a target impact speed of between substantially 1,000 and 2,500 meters per second for impacting said active armored target without detonation thereof, and wherein said delay timing means imparts an activation delay of between substantially 50 and 300 sec between initiation of the forward charge and subsequent initiation of the rearward charge.



4,714,023

NON-TOXIC SHOT

John E. Brown, 8 Northwood Dr., St. Catharines, Canada

Filed Mar. 27, 1986, Ser. No. 844,519
Int. Cl.[4] F42B *11/04*
U.S. Cl. 102—516 7 Claims

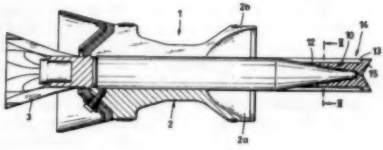
1. A non-toxic wildlife shot pellet for shotgun shells and the like comprising a lead shot pellet having an essentially uniform coating of nickel-phosphorous alloys having a Rockwell hardness of at least 45, where said coating is applied to said pellet by an electroless nickel-phosphorous alloy coating process.

4,714,024

NOSE FOR AN INERTIAL PROJECTILE

Jürgen Böcker, Oberhausen; Klaus W. Klein, Neuss; Klaus Gersbach, Willich, all of Fed. Rep. of Germany; Jean-Claude Sauvestre, Saint-Doulchard, and Patrick Montier, Bourges, both of France, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany and L'Etat Francais represente par le Delegue Ministeriel pour l'Armement, Paris, France

Continuation-in-part of Ser. No. 603,133, Apr. 23, 1984, abandoned. This application Jun. 13, 1986, Ser. No. 874,048
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1983, 3314751
Int. Cl.[4] F42B *13/16*
U.S. Cl. 102—521 2 Claims



1. In an inertial projectile having a large length to diameter ratio with a segmented sabot surrounding the projectile body, whose segments are held to the projectile body by force locking bonding agents during passage through a gun barrel showing a frontal synclinal recess, which after the projectile has left the gun barrel causes a breaking up and separation of the segments from a front end due to high pressure within the recess from an oncoming airstream, the improvement comprising,

a conical projectile nose protruding over a front edge of the sabot;

a cylindrical projectile mantle enlarged hood which protects the sabot, during separation of the segments from the projectile body, from pressure fluctuations, and which increases the drag coefficient of the projectile;

said nose corresponding substantially with one of its frontal diameters to the diameter of the cylindrical projectile mantle enlarged hood;

said hood releasing itself from the projectile nose only after separation of the sabot from the projectile body, thereby decreasing the drag coefficient of the projectile.

4,714,025

ARRANGEMENT FOR A SWITCHBOARD DESK

Per Olov T. Wallin; Bengt H. Warell; Ake P. Svensson, all of Televerket, S-123 86 Farsta; Kurt A. Lundström, Televerket Industridivisionen, Svedjer. 12 S-931 36 Skellefteå , and Lars A. Johansson, KamomillgåAngen 25, 611 45 Nyköping, all of Sweden

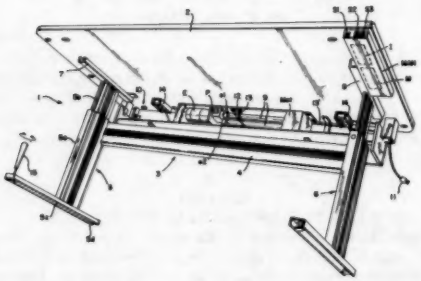
PCT No. PCT/SE85/00110, § 371 Date Nov. 18, 1985, § 102(e) Date Nov. 18, 1985, PCT Pub. No. WO85/04083, PCT Pub. Date Sep. 26, 1985

PCT Filed Mar. 12, 1985, Ser. No. 803,760

Claims priority, application Sweden, Mar. 16, 1984, 8401479

Int. Cl.[4] A47B *85/00*

U.S. Cl. 108—20 **7 Claims**



1. An arrangement for adjusting the height of a table, comprising:

a table top and at least two telescopic legs for supporting said table top above a floor;

hydraulic cylinders positioned in each of said telescopic legs for adjusting the length of said telescopic legs, said hydraulic cylinders being connected to at least one hydraulic pump for supplying hydraulic fluid to said hydraulic cylinders said hydraulic pump being driven by a single electric motor;

a first switching device for controlling rotation of said electric motor in a first direction and driving said hydraulic pump in a first direction thereby supplying hydraulic fluid to said hydraulic cylinders for moving said table top downwardly;

a second switching device for controlling rotation of said electric motor in a second direction and driving said hydraulic pump in a second direction thereby supplying hydraulic fluid to said hydraulic cylinders for moving said table top upwardly; said first and second switching devices comprising first and second manual switches connected to first and second relays for supplying electric current for rotating said electric motor in said first and second directions, respectively, and wherein each of said switching device has two contact fingers to disrupt the current supply to said electric motor upon simultaneous activation of both manual switches;

a monitoring device for monitoring the height position of said table top; said monitoring device comprising a potentiometer mounted to a drive shaft of said electric motor, and connected to a voltage source, said potentiometer having slider contact connected to a digital voltmeter for indicating the height position of said table top; and

an indication device for indicating of said position.

4,714,026

PALLET FOR MATERIAL HANDLING

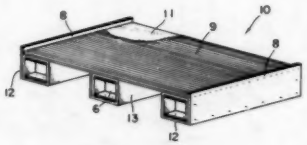
Akio Yamaguchi, Saitama, and Kazushi Yoshikawa, Mie, both of Japan, assignors to Honda Giken Kogyo Kabushi Kaisha, Tokyo, Japan

Filed Apr. 7, 1986, Ser. No. 849,208

Claims priority, application Japan, Apr. 17, 1985, 60-80066; Apr. 17, 1985, 60-56178[U]; Apr. 17, 1985, 60-56179[U]

Int. Cl.[4] B65D *19/00*

U.S. Cl. 108—51.1 **20 Claims**



1. A pallet for material handling, comprising:

a deck board made of corrugated fibreboard and having a lower surface facing downward, an upper surface facing upward, and at least two vertical side walls facing sideway opposite each other, said upper surface having a friction coefficiency;

means for enhancing said friction coefficiency of said upper surface and including a member arranged on said upper surface with a friction coefficient greater than that of said upper surface;

square tubular legs fixed to said lower surface and each constituting a square-frame, said square tubular legs being composed of corrugated fibreboard and having an open end portion and an axial direction;

means for strengthening said square tubular legs against bending and collapse, said strengthening means including a plastic resin pad arranged within said square tubular legs;

means for sealing said end portions of said tubular legs and including a cap; and

means for reinforcing at least two of said square tubular legs to resist bending in said axial direction and for preventing slippage of material to be handled, said reinforcing and preventing means including a protruded end portion formed on each of said two square tubular legs as an extended part thereof, said protruded end portion being arranged to project upward beyond said member on said upper surface and bieng attached to a respective one of said two vertical side walls, said protruded end portion including a third vertical side wall parallel to said two vertical side walls.

4,714,027

KNOCKDOWN FURNITURE

Kurt J. Stern, 337 N. Crescent Heights Blvd., Los Angeles, Calif. 90048

Filed Oct. 14, 1986, Ser. No. 919,202

Int. Cl.[4] A47B *47/00*

U.S. Cl. 108—111 **6 Claims**

1. An article of furniture comprising, in combination:

(a) a plurality of horizontally-oriented shelves, each of said shelves comprising a plurality of spaced-apart slats;

(b) a plurality of mortises within each of said shelves, said mortises being formed by notches in opposed slats thereof;

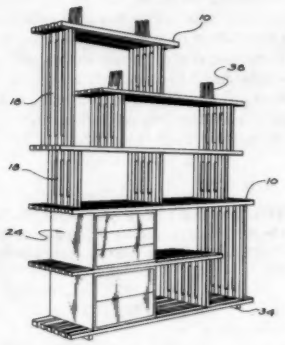
(c) said plurality of mortises being arranged into a plurality

of sets of mortises, each of said sets being arranged transverse to the length of said shelves;

(d) said sets of mortises including a group of sets that are equally spaced by a first amount along the lengths of said shelves;

(e) said sets adjacent the opposed ends of each of said shelves being spaced by a second amount from the sets of said group, said second amount being less than said first amount;

(f) a plurality of vertical supports, each of said supports being oriented perpendicular to at least one of said shelves



and including a plurality of tenons for interlocking the mortises of said at least one shelf.

(g) at least one foot member, said member including a plurality of tenons for interlocking one of said shelves;

(h) at least one unit comprising at least one drawer, said unit having a top surface and a bottom surface arranged substantially parallel thereto, said top and bottom surfaces being separated by an amount that is equal to the height of said vertical supports; and

(i) said unit includes pairs of parallel rails fixed to its top and bottom surfaces and arranged so that said unit is slidably mounted with respect to a pair of said shelves.

4,714,028

HEIGHT ADJUSTABLE TABLE

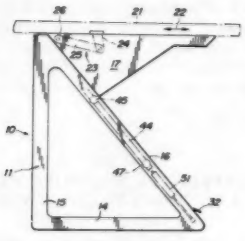
Angela Uredat-Neuhoff, Lindern/Oldenburg, Fed. Rep. of Germany, assignor to Inaba Seisakusho Ltd., Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 843,336

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1985, 3512201; Apr. 3, 1985, 8510001[U]

Int. Cl.[4] A47B *11/00*

U.S. Cl. 108—144 **8 Claims**



1. A height adjustable table comprising:

at least one side frame including a level element adapted to be placed on a floor and a hollow oblique element having an upper portion and connected to the level element to extend obliquely upwardly therefrom;

a horizontal table top;

at least one table top side support having an upper horizontal surface for supporting said horizontal table top thereon;

height adjusting means including a rod connected to said table top side support and located within said hollow oblique element and means for moving said rod within said hollow oblique element to move said side support and table top supported thereon to a desired height relative to said side frame;

means for securing said rod and thus said side support and table top at said desired height; and

an adjusting device connecting said table top and said side frame for moving said table top laterally on the upper horizontal surface of said table top side support while said side support and table top are moved to said desired height with minimal lateral movement of said table top relative to the side frame.

4,714,029

LOCKABLE CASSETTE FOR VALUABLE OBJECTS

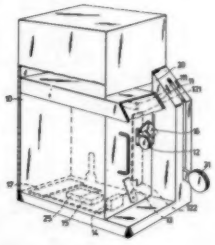
Gustav L. Idegren, Mellösa; Lars-Goran L. Gyllstal, Katrineholm, and István V. Bartha, Flen, all of Sweden, assignors to Inter Innovation AB, Stockholm, Sweden

Filed Jan. 23, 1986, Ser. No. 824,398

Claims priority, application Sweden, Feb. 1, 1985, 8500455

Int. Cl.[4] E05G *1/00*; E05B *49/04*; G07D *1/50*; G07F *9/06*

U.S. Cl. 109—45 **1 Claim**



1. A lockable cassette system for accommodating valuable papers or objects, comprising: a cassette (**10**), a displaceable lid (**11**) for accessing an interior of the cassette, the cassette being closed and locked when withdrawn from a surrounding housing (**20**), and when inserted into the housing enabling the electrical activation of a latch (**13**), said latch having a first position blocking the displacement of the lid, and being movable to a second, non-blocking position provided that said electrical activation takes place in accordance with a pre-set program through the mutual engagement of respective contact members (**15, 25**) individually mounted on the cassette and the housing, such engagement supplying a predetermined signal pattern to a locking circuit in the cassette in accordance with the pre-set program, wherein,

(a) the locking circuit includes a programmable memory (**171**), a comparison circuit (**172**) and a logic circuit (**173**),

(b) the memory is accessible for external programming when the cassette is removed from the housing and opened with the aid of a locking code, without necessitating any disturbing or destructive measures, and when in operation feeds a series of pulses to the comparison circuit,

(c) the comparison circuit serially compares, pulse for pulse, pulses fed thereto from the memory with a series of locking code pulses fed thereto from an external control source via the engaged contact members,

(d) the logic circuit (**173**) blocks a latch opening function of the locking circuit in the absence of agreement between any two pulses in corresponding positions in the comparison circuit, such blocking of said opening function not being discernable externally until a serial comparison of

the entire series of locking code pulses has been completed, and

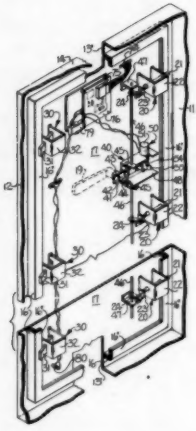
(e) the logic circuit initiates the latch opening function of the locking circuit only upon the completion of said serial comparison when agreement is found between all compared pulses.

4,714,030

SECURITY CABINET WITH DISGUISED ELECTRONIC CONTROL PANEL

David M. Cole, Roanoke, Va., assignor to Tread Corporation, Roanoke, Va.

Filed Dec. 3, 1984, Ser. No. 677,219
Int. Cl.[4] E05G *1/04*; E05B *49/00*
U.S. Cl. 109—61 **10 Claims**



1. In a cabinet of metal construction and adapted to be used for protecting one's valuables, said cabinet having a front wall with an opening therein for accommodating a door, a doorjamb defining the door opening in the front wall and including door stop means along at least opposite sides thereof, and a door hingedly connected to said metal cabinet along one side of the doorjamb and adapted when closed to abut against the door stop means and close the opening,

the combination therewith of first and second locking means mounted adjacent respective opposite side edges of said door and cooperating with said doorjamb when the door is closed to normally maintain the cabinet door in locked closed position, said first locking meaan being adjacent the free side edge of the door remote from the hinged side edge of the door and being movable from a retracted unlocked postion, allowing the door to be opened, to an extended locked position for engaging the doorjamb and preventing outward movement of the door,

handle means movably mounted on the outside of the door,

means interconnecting said handle means and said first locking means and responsive to movement of said handle means relative to said door for moving said first locking means to either the locked or unlocked position,

electrically operable latching means operably connected to said interconnecting means and normally maintaining said interconnecting means in a latched position for maintaining the cabinet door in the locked closed position and comprising a solenoid mounted on the inside of the door and having a longitudinally movable arm, a latching bar pivotally connected to said door and normally positioned in latching engagement with said means interconnecting said handle means and said first locking means and pivotally moveable by said solenoid arm upon energization of said solenoid to an unlatching position, and

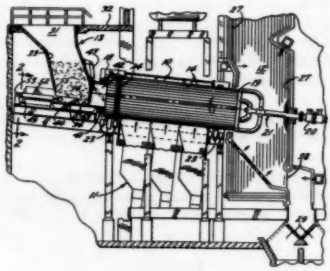
electronic control means including a disguised control panel mounted on the outer face of said door and electrically connected to said latching means, said disguised control panel having a visually hidden array of switches thereon arranged so that a predetermined preselected sequence of actuation of said array of switches effect actuation of said latching means for movement thereof from said latched position to an unlatched position for permitting retraction of said first locking means by manual movement of the handle on the door to thereby permit the door to the cabinet to be opened, and wherein said electronic control means further includes a self-contained electrical power source carried inside the cabinet and further comprising an electrical outlet located on said cabinet and accessible from the outside of said cabinet and being connected to said electronic control means so that said electronic control means may be operated by a suitable external source of electrical power should the main power source included in said electronic control means not function properly when the cabinet is locked.

4,714,031

COMBUSTOR FEEDING ARRANGEMENT

John T. Healy, Irvine, and Joel W. Johnson, Newport Beach, both of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 5, 1987, Ser. No. 510
Int. Cl.[4] F23K *3/12, 3/16*
U.S. Cl. 110—109 **6 Claims**



1. A feeding arrangement for a combustor having an open end for receiving combustible material comprising, in combination, a wall closing said open end of said combustor and defining a doorway, a generally vertical chute including said wall, leading to said doorway and having a lower floor aligned with the bottom of the doorway, a ram mounted for reciprocation over said lower floor and into and through said doorway, a door mounted to normally close said doorway and being movable to open the doorway when pushed by said ram and combustible material, means for biasing said door toward a closed position, and means for reciprocating said ram, said ram, door and biasing means cooperating to positively push material into and through said doorway by only reciprocating said ram.

4,714,032

POLLUTION-FREE PRESSURIZED COMBUSTION UTILIZING A CONTROLLED CONCENTRATION OF WATER VAPOR

Norman L. Dickinson, Monte Sereno, Calif., assignor to Dipac Associates, Monte Sereno, Calif.

Filed Dec. 26, 1985, Ser. No. 813,486
Int. Cl.[4] F23D *1/00*
U.S. Cl. 110—347 **18 Claims**

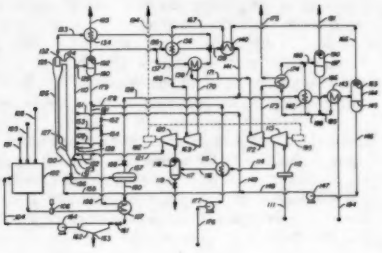
1. A continuous combustion process comprising pressurizing an aqueous slurry of fuel particles containing alkali in an

amount at least the chemical equivalent of the sulfur in the fuel particles;

pressurizing an oxygen-containing gas;

mixing the pressurized fuel slurry, the pressurized oxygen-containing gas and particles of recycled solid products in an inlet zone of an elongated reactor to form a mixture comprising a gaseous phase of oxygen-containing gas and water vapor in which the particles of fuel, alkali and recycled solid products are entrained;

permitting combustible portions of the fuel particles to burn at a temperature not exceeding 1600° F. as the mixture flows from the inlet zone to a reactor outlet while maintaining a partial pressure of water vapor of at least 3 atmospheres, as measured at the outlet, forming a reactor



effluent comprising gaseous products in which particles of net and recycled solid products are entrained;

passing the effluent through a gas-solids separating device, forming gaseous products carrying fine particles of unseparated solid products and separated net and recycled solid particles;

returning the recycled portion of the separated solid particles to the inlet zone;

withdrawing the net portion of the separated solid particles;

cooling the gaseous products containing the unseparated particles at essentially combustion pressure, by extracting useful heat therefrom, to a temperature below their dew-point, forming a flue gas and a fines slurry containing the unseparated solid particles.

4,714,033

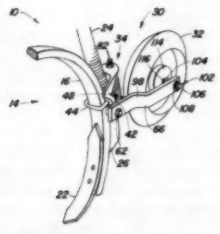
SHANK-MOUNTED PRESS WHEEL ASSEMBLY

Lowell H. Neumeyer, Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Aug. 6, 1986, Ser. No. 893,526

Int. Cl.[4] A01C *7/20*

U.S. Cl. 111—85 **8 Claims**



1. In an implement having a shank-supported tool adapted for forward movement through the soil, a shank-mounted press wheel assembly adapted for connecting a fore-and-aft extending press wheel arm to the shank, the assembly comprising:

a bracket body having an upright central portion adapted for positioning against the aft face of the shank, an upper end portion connected to the upper end of the central portion and including forwardly projecting and transversely spaced ears adapted for positioning closely adjacent the sides of the shank, a lower end portion connected to the lower end of the central portion and including a rearwardly projecting transversely apertured pivot area closely adjacent the aft face of the shank, and a leg extending rearwardly from the upper end portion;

means pivotally connecting the press wheel arm to the pivot area for rocking vertically with respect to the bracket body;

a down-pressure spring;

means for supporting the down-pressure spring between the leg and the press wheel arm; and

clamp means for selectively securing the body to the aft face and permitting adjustment of the body vertically along the length of the shank.

4,714,034

BUTTON FEEDING DEVICE FOR BUTTON ATTACHING MACHINES

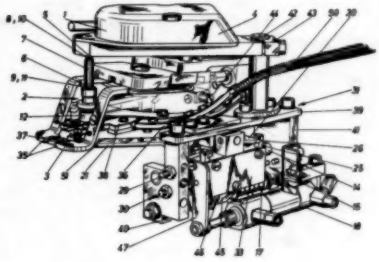
Gerhard Riss, and Richard Fuerhoff, both of Bielefeld, Fed. Rep. of Germany, assignors to Durkoppwerke GmbH, Fed. Rep. of Germany

Filed May 30, 1986, Ser. No. 869,110

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1985, 3519659

Int. Cl.[4] D05B *3/22*

U.S. Cl. 112—113 **13 Claims**



1. A button feeding device for aligning a button and placing it in sewing position, comprising:

receiving means for receiving a button from a magazine and locating it in an alignment station;

driver disk means at said alignment station for rotating such button to align it so that holes in the button are in a desired position;

button clamp means at a sewing station for receiving such button after alignment and placing the button at a sewing position;

pin holder means for holding such button in operative engagement with said driver disk means for being aligned thereby and transferring the button to said button clamp means after alignment;

alignment shaft means on which said driver disk means is mounted for rotation, said alignment shaft means having a first longitudinal axis; and

drive means having a second longitudinal axis for rotating said alignment shaft means;

said alignment shaft means being displaceable such that said second longitudinal axis is displaceable with respect to said first longitudinal axis, while still being rotatable by said drive means.

4,714,035

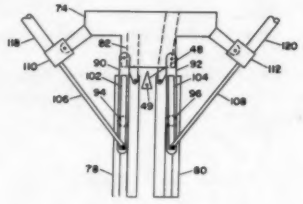
PLACKET LINING MACHINE

Elbert Eagle, Ashville, Ala., assignor to Chesebrough-Pond's, Inc.

Division of Ser. No. 498,463, May 31, 1983, Pat. No. 4,606,286. This application Jul. 23, 1986, Ser. No. 889,317

Int. Cl.[4] D05B *3/10*

U.S. Cl. 112—114 **6 Claims**



1. Apparatus for clamping and straightening a segmented edge on a piece of material comprising a clamp support moveable between clamping and unclamping positions, at least two clamp members mounted to said clamp support, at least one of said clamp members being arranged to pivot with respect to said support and said other clamp member on a pivot axis, and means for adjusting the spacing of said pivot axis with respect to said other clamp.

4,714,036

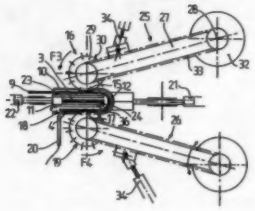
GUIDING DEVICE FOR THE FORMATION OF A FOLD ALONG THE EDGE OF A FABRIC

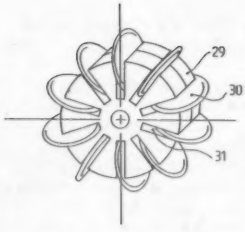
Jean-Pierre Raisin, Troyes, and Alain Canaud, Estissac, both of France, assignors to Institut Textile DeFrance, Boulogne-Billancourt, France

Filed Apr. 20, 1987, Ser. No. 39,699

Int. Cl.[4] D05B *35/02, 35/06, 35/10*

U.S. Cl. 112—147 **6 Claims**





1. A guiding device for forming a regular fold on a supple piece before a stitching station intended for automatically closing the fold,

wherein it comprises, placed in the vicinity of the stitching station and upstream thereof in the direction D of displacement of the piece in the course of stitching,

a. a passive guiding assembly, consisting of two elements, one being placed inside the other during formation of the fold:

the inner element whose two upper and lower faces are plane and horizontal, the lower face being substantially in the working plane of the stitching station,

the outer element having the form of a U and enveloping the inner element on one side and the two horizontal faces, these two elements being positioned with respect to each other so that there exists between said elements a U-shaped recess sufficient to allow passage of the supple piece and effecting formation of the fold, upon passage of the piece in the bent part of said recess,

b. a correction device comprising:

a device for detecting the presence of the piece placed, beneath the passive guiding assembly, at a distance approximately equal to the width of the desired fold with respect to the bent part of the recess between the two elements of the passive assembly;

an active guiding assembly consisting of at least one active guide, abutting on the supple piece when it is in contact with one of the faces of the inner element, and ensuring displacement of the piece substantially transversely with respect to the direction D of stitching as a function of the instructions given by the detection device.

4,714,037

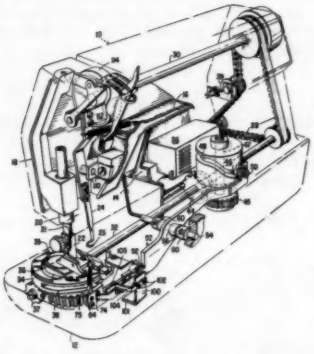
NEEDLE LOOPER ASSEMBLY FOR NON-THREADED NEEDLE LOCKSTITCHING

Ralph E. Johnson, Convent Station, and Donald Rodda, Butler, both of N.J., assignors to The Singer Company, Stamford, Conn.

Continuation of Ser. No. 97,599, Nov. 26, 1979, abandoned. This application Aug. 12, 1981, Ser. No. 292,071

Int. Cl.[4] D05B *57/08*

U.S. Cl. 112—184 **5 Claims**



1. A needle looper assembly for a lockstitch sewing machine having a frame of a total height and including a bed of uniform height less than ½ of said total height, a drive means supported within said frame, a looptaker driven by said drive means, said needle looper assembly being supported in said bed and being used to draw a loop of upper thread down through a work material supported on said bed to said looptaker for concatentation with a lower thread; said needle looper assembly comprising:

a lever pivotally carried within said bed, a needle rigidly clamped to one end of said lever substantially normal thereto, a means associated with said needle for selectively retaining said upper thread; means driven by said drive means for oscillating said lever to urge said needle to an elevated position through said work material and to a

retracted position adjacent said looptaker; and, means supported within said bed for actuating said retaining means for receiving said upper thread when extended through said work material, for retaining said upper thread when traveling through said work material to said retracted position adjacent said looptaker, and for releasing said upper thread to said looptaker when retracted to said position adjacent said looptaker.

4,714,038

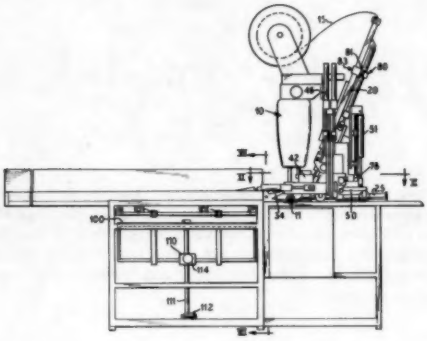
METHOD FOR SEWING ZIPPER CHAIN TO ELONGATED FABRIC PIECES

Ronald J. Boser, Huntington, N.Y., assignor to Yoshida Kogyo K. K., Tokyo, Japan

Division of Ser. No. 894,117, Aug. 7, 1986, Pat. No. 4,674,422. This application May 4, 1987, Ser. No. 45,477

Int. Cl.[4] D05B *23/00, 97/00*

U.S. Cl. 112—265.2 **1 Claim**



1. A method of sewing a pair of fabric pieces to zipper chain comprising the step of:

aligning the fabric pieces with longitudinal edges to be sewn in spaced relation,

advancing the fabric pieces individually and simultaneously to a sewing station while simultaneously folding over the longitudinal edge of each fabric piece,

positioning a chain at said sewing station immediately above said fabric,

sewing simultaneously the sides of said chain to respective folded edges of the fabric through the length of the longitudinal edges of the fabric while continuously feeding said chain and feeding and guiding properly folded fabric to the sewing station;

pulling the sewn materials through the sewing station under substantially constant tension;

sensing the trailing end of the fabric edges and cutting said chain at a length at least as long as the length of the said edges;

cutting the sewing thread following completion of the sewing of the chain and fabric.

4,714,039

SEWING MACHINE DRIVING SYSTEM

Masami Shimada, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 15, 1986, Ser. No. 919,177

Claims priority, application Japan, Oct. 17, 1985, 60-231687

Int. Cl.[4] D05B *69/22*

U.S. Cl. 112—275 **18 Claims**

1. A sewing machine driving system comprising:

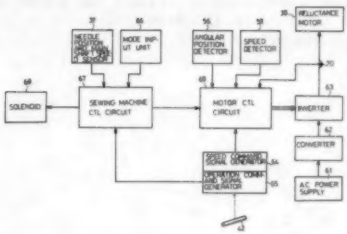
a reluctance motor operatively coupled to a sewing machine main shaft and having a stator and a rotor;

a drive circuit for driving said reluctance motor;

an angular position detector for detecting the angular position of said rotor with respect to said stator;

a needle position detector for detecting the position of a sewing needle connected to said main shaft;

a first control unit responsive to a drive command and a



signal from said angular position detector for driving said reluctance motor at variable speeds; and

a second control unit responsive to a stop command and signals from said angular position detector and said needle position detector for braking said reluctance motor to stop said sewing needle in a prescribed needle position.

4,714,040

SEWING MACHINE FOUR MOTION SPEED

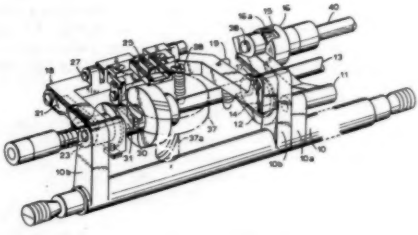
Noboru Kasuga, Tokyo, Japan, assignor to Janome Sewing Machine Co., Ltd., Japan

Filed Jul. 15, 1986, Ser. No. 886,542

Claims priority, application Japan, Jul. 15, 1985, 60-106976[U]

Int. Cl.[4] D05B *27/02*

U.S. Cl. 112—323 **2 Claims**



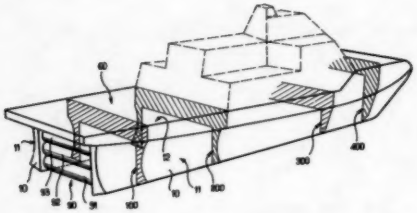
1. A feeding mechanism of a sewing machine including a feed dog vertically and horizontally movable to feed a fabric to be sewn with respect to a needle plate, a feed shaft (**10**) rockable about a horizontal axis to move the feed dog in a horizontal plane, cam and link means for rocking said feed shaft about said horizontal axis, and a further shaft (**13**) rotated to drive a loop taker (**37**) and said cam and link means, the feeding mechanism comprising a first feed base (**18**) having one end pivotably connected to said feed shaft; a second feed base (**26**) to which said feed dog is secured, said second feed base being pivotably supported on said first feed base at another end thereof; a first cam (**23**) secured to said further shaft (**13**) for rotation therewith, said first cam engaging said first feed base to vertically shift the same while said first feed base is moved in a horizontal plane by said feed shaft, and a second cam (**31**) secured to said further shaft (**13**) for rotation therewith, said second cam engaging said second feed base to vertically shift the same while said first feed base is moved in said horizontal plane.

4,714,041

STRUCTURE OF SURFACE EFFECT SHIP WITH SIDE WALLS

Robert Jaffre, Lorient, and Yvon Ropars, Mours, both of France, assignors to Etat Francais, Paris, France

Filed Apr. 8, 1986, Ser. No. 849,274
Claims priority, application France, Apr. 9, 1985, 85 05311
Int. Cl.[4] B63B *3/32, 1/32*
U.S. Cl. 114—67 A **10 Claims**



1. A surface effect ship including a catamaran-type supported structure with two side hulls connected by a central box structure, able to operate either as displacement vehicle or as an air cushion lifted vehicle, wherein said ship comprises:

a plurality of continuous longitudinal stiffeners with said sidewalls for bearing longitudinal bending stresses;

continuous transverse framing within said central box structure connecting said side hulls thereto and built-in within said hulls for bearing transverse bending stresses; and

at least one stiffened transverse bulkhead located toward the bow and at least one stiffened transverse bulkhead located toward the stern of said ship, respectively, to bear transverse bending stresses applied on the stern and the bow of said ship resulting from diagonal twist moments on said ship, each said bulkhead comprising a transverse beam-like structure within said central box structure, said beam like structure comprising a vertical web portion strengthened within said central box structure by upper and lower horizontal flanges, said web portion extending continuously down within said hulls, each said bulkhead longitudinally subdividing the hulls and said central box structure of said ship and providing structural integrity thereto.

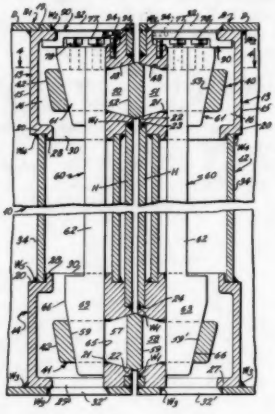
4,714,042

BARGE COUPLER ASSEMBLY

Frank Schulte, Box 26, Mayo, Fla. 32066

Filed Oct. 24, 1986, Ser. No. 923,042
Int. Cl.[4] B63B *3/08*
U.S. Cl. 114—77 R **18 Claims**

1. A coupling apparatus for selectively connecting two or more floating marine structures wherein each structure includes a hull portion and a deck portion comprising upper and lower aligned and vertically spaced coupler housings which are mounted to the hull portions of each structure, each of said upper and lower coupler housings having a first opening therein which is generally horizontally oriented outwardly with respect to the hull of the floating marine structure and a second opening which is vertically oriented upwardly generally perpendicularly with respect to said first opening, at least said upper coupler housing having a third downwardly oriented opening therein which is generally axially aligned with said second opening of said lower coupler housing, a first connector means removably disposed within said first openings of said upper coupler housings and a second connector means removably disposed within said first openings of said lower coupler housings, each of said first and second connector means having an intermediate portion and opposite end portions, said end portions being of a size to pass through said first openings and into said upper and lower coupler housings, said first openings being defined by side walls of predetermined configuration, said intermediate portion of said first and second connector means being of a size to be cooperatively seated with said side walls defining said first openings into said upper and lower coupler housings and including an outermost flange portion which extends outwardly beyond said first openings in said upper and lower coupler housings so that said flange portion will retain said upper and lower coupler housings in



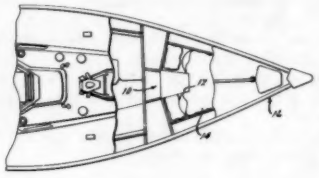
spaced relationship with respect to one another, and retainer means extendable through said upper coupler housings and into said lower coupler housings and engageable with said first and second connector means to retain said first and second connector means within said upper and lower coupler housings, respectively.

4,714,043

POWERED V-BERTH PLATFORM

William L. Sheppard, 36655 Romulus Rd., Romulus, Mich. 48174

Filed Aug. 11, 1986, Ser. No. 895,461
Int. Cl.[4] B63B *29/06, 29/10*
U.S. Cl. 114—343 **14 Claims**



1. A powered platform for use in combination with a conventional V-berth comprising:

(a) a generally horizontal, flat, cushion element having a shape in plan substantially corresponding to that of the gap in the V-berth;

(b) a vertically extending support structure supporting said cushion element for movement between a lowered seating position and a raised sleeping position in which it is substantially flush with said V-berth; and

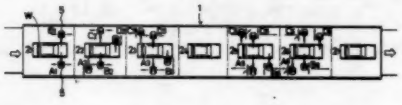
(c) powered drive means for moving said support structure between said two positions.

4,714,044

PAINTING APPARATUS FOR VEHICLE BODY

Uhee Kikuchi, Sayama, and Tadashi Takeo, Sakado, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 2, 1986, Ser. No. 881,302
Claims priority, application Japan, Jul. 2, 1985, 60-143900
Int. Cl.[4] B05B *13/04, 15/12;* B05D *1/02*
U.S. Cl. 118—314 5 Claims



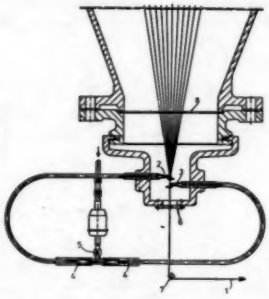
1. A painting apparatus for a vehicle body comprising a long paint booth through which the vehicle is conveyed, said paint booth including a plurality of stage means positioned longitudinally in series, at least two of said plurality of stage means being provided with painting robots disposed therein such that while the vehicle body is passed through the painting booth, inner and outer panel regions thereof are painted by said painting robots, wherein the vehicle body is stopped at each of said stage means, and each of the painting robots comprises a multi-axis robot and bell-type atomizer attached thereto, and wherein said plurality of stage means are in communication with one another without partitions therebetween.

4,714,045

DEVICE FOR WETTING THREADS, FILMS OR THREAD BUNDLES WITH LIQUIDS

Ulrich Reinehr; Rolf-Burkhard Hirsch; Joachim Dross, and Hermann-Josef Jungverdorben, all of Dormagen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 11, 1986, Ser. No. 851,064
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515091
Int. Cl.[4] B05C *3/12*
U.S. Cl. 118—420 5 Claims



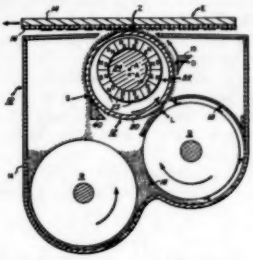
1. In a spinning shaft end device for wetting threads, films or thread bundles which are transported from top through bottom thereof with a liquid including having means for releasing the liquid, conduits and a storage container and transporting means, the improvement wherein the means for releasing the liquid has at least two slotted nozzles positioned one above the other and opposite each other and each having a horizontal slot, and rods attached at slot ends, which, seen from above, form an angle with the slot of from 100° to 170°.

4,714,046

ELECTROGRAPHIC MAGNETIC BRUSH DEVELOPMENT APPARATUS AND SYSTEM

Bruce B. Steele, Wyandotte, Mich.; Allen J. Rushing, Webster, and Kelly S. Robinson, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 20, 1985, Ser. No. 799,769
Int. Cl.[4] G03G *15/09*
U.S. Cl. 118—657 9 Claims



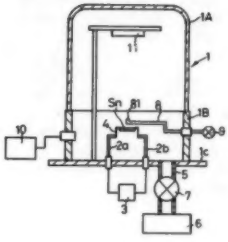
1. Magnetic brush apparatus for applying a magnetically attractive developer to a moving electrostatic image-bearing member at a development zone to effect developoment of such image, said apparatus comprising a cylindrical sleeve of non-magnetic material having a single magnetic core piece positioned therein, said core piece being rotatably driven and adapted to transport developer over a major portion of the sleeve surface, said core piece having a rotational axis which is displaced from the longitudinal axis of said cylindrical sleeve, said rotational axis lying in a first plane passing through the sleeve axis which is angularly displaced with respect to a second plane connecting the sleeve axis and the line of closest contact between said sleeve and said image-bearing member, said annular displacement being between 0° and 20° in a direction upstream of said second plane, as determined by the direction of rotation of said core piece.

4,714,047

METHOD AND DEVICE FOR FORMING ULTRAFINE PARTICLE FILM OF COMPOUND

Hirotane Ikeda, Nishio; Tadashi Hattori, Okazaki; Minoru Ohta, Okazaki, and Shinichi Mukainakano, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 18, 1986, Ser. No. 853,761
Claims priority, application Japan, Apr. 20, 1985, 60-84930
Int. Cl.[4] C23C *14/08, 14/26*
U.S. Cl. 118—724 3 Claims



1. A device for forming an ultrafine particle film of compound, comprising:

a vessel for forming a reactive gas atmosphere;

an evaporation source for retaining and heating a material to be evaporated;

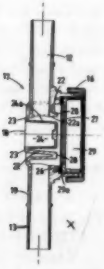
a base plate on which ultrafine particles of compound are to be deposited;
said evaporation source being provided in the base portion within said vessel;
said base plate being provided in the upper portion within said vessel;
said evaporation source and said base plate being disposed so as to be opposed to each other in the vertical direction; and
a gas introducing pipe for supplying a reactive gas into said vessel; said gas introducing pipe having a gas injection port which is positioned in an interaction area adjacent to said evaporation source, in which evaporation of said material concentrically exists,
wherein said gas injection port is positioned at a center of said interaction area,
wherein said gas injection port is formed into a nozzle provided with a plurality of small holes through which said reactive gas injects,
wherein said gas injection port is positioned above said evaporation source so as to face said evaporation source.

4,714,048

LIQUID FLOW SENSING DEVICE

Keith W. Jefferies, Palmerston North, and Murray D. Long, Foxton, both of New Zealand, assignors to Allflex International Limited, Palmerston North, New Zealand

Filed Nov. 15, 1985, Ser. No. 798,687
Claims priority, application New Zealand, Nov. 19, 1984, 210240
Int. Cl.[4] A01J *7/00*
U.S. Cl. 119—14.08 **25 Claims**



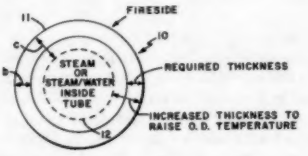
1. A liquid flow sensing device comprising:
a flow sensor having a flow passage through which liquid can flow, said flow passage having a first wall and a second wall, said flow sensor comprising a body having an annular space therein and into which opens an inlet whose cross-sectional area is substantially the same as the cross-sectional area of said annular space, said body having an outlet coaxially disposed with respect to said inlet, said annular space being formed at least in part by said first wall and said second wall and disposed such that the axis of said annular space is at substantially right angles to the axis of said inlet and outlet,
a first electrode disposed with a first wall of the flow passage so as to extend about a portion of the flow passage so as to extend about a portion of the flow passage,
a second electrode disposed with a second wall of the flow passage in that portion of the flow passage about which the first electrode extends such that a least portions of the electrodes are in an opposing disposition,
electronic detection means coupled to said electrodes for detecting a varying capacitance between the electrodes as the amount of liquid flow through the passage varies and
flow passage closure means comprising a diaphragm mounted with said body, said diaphragm having a first surface which can sealingly close said annular space such that the fluid flow to said outlet is prevented, and a second surface exposed to a chamber in which a sub-atmospheric pressure can be established.

4,714,049

APPARATUS TO REDUCE OR ELIMINATE FLUID BED TUBE EROSION

Daniel E. McCoy; Donald L. Garver, and George Hileman, all of Williamsport, Pa., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Oct. 8, 1986, Ser. No. 916,689
Int. Cl.[4] F22B *1/00*
U.S. Cl. 122—4 D **13 Claims**



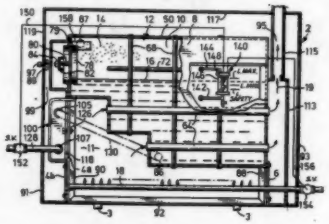
1. A fluidized bed boiler or reactor, comprising a housing, a reaction chamber within said housing, air distribution means within said reaction chamber, a plurality of heat exchange tubes approximately horizontally disposed and arranged with a fluidized bed region within the chamber, wherein the improvement comprises:
fin means being associated with said heat exchange tubes, said fin means comprise a plurality of individual fins circumferentially arranged around said heat exchange tubes and spaced from each other along the axis of said heat exchange tubes by a distance of between 0.25–2.00 inches and said heat exchange tubes having an outer diameter in the range between 1–6 inches, whereby the fire-side temperature of said heat exchange tubes is increased so as to result in the coating of said heat exchange tubes with a thin film of material from said fluidized bed region which protects said heat exchange tubes from erosion.

4,714,050

PRE-HEATER

David J. Nichols, Brampton, Canada, assignor to Garland Commercial Ranges Limited, Mississauga, Canada

Filed Aug. 29, 1985, Ser. No. 770,569
Int. Cl.[4] F22B *5/00*
U.S. Cl. 122—13 R **2 Claims**



1. An industrial oven, including the combination of:
(a) a steam generating tank having a fluid inlet and steam outlet;
(b) walls depending from said tank and defining a combustion chamber therebelow;
(c) said tank presenting a stepped portion within said combustion chamber;
(d) a preheater associated with one of said walls exteriorally

of said combustion chamber and having a water inlet therein, and a water outlet thereof, said preheater water outlet communicating with the tank inlet;

(e) said preheater located in the region adjacent said tank and opposite said stepped portion so as to concentrate heat energy between said preheater and said stepped portion of said tank;

(f) said preheater including a wall adapted to contact an overlap one of said stepped portions in said combustion chamber;

(g) means for generating heat energy within said combustion chamber so as to preheat water within said preheater and generate steam from water within said tank;

(h) means for controlling the introduction of water into said preheater and into said tank so as to minimize the drop of steam pressure in said tank during introduction of water into said tank;

(i) said tank including a steam generator in the region adjacent said steam outlet for separating water from said steam in said tank.

4,714,051

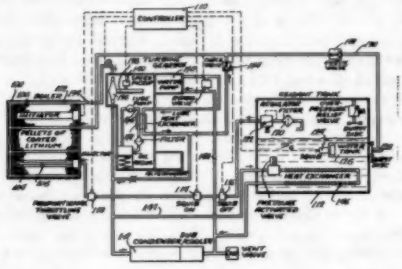
POWER SOURCE UTILIZING ENCAPSULATED LITHIUM PELLETS AND METHOD OF MAKING SUCH PELLETS

John T. Buford, Winnebago, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Division of Ser. No. 618,893, Jun. 8, 1984, Pat. No. 4,634,479. This application Aug. 29, 1986, Ser. No. 901,575

Int. Cl.[4] F22B *1/00, 3/00*

U.S. Cl. 122—21 **6 Claims**



1. An energy source comprising:

a boiler having an oxidation chamber and a working fluid chamber in heat exchange relation therewith;

means connected to said working fluid chamber for conveying heated working fluid therein to a point of use;

a body of lithium pellets in said oxidation chamber, said pellets being coated with a thin layer of predominantly fluorine substituted polymeric material;

a controllable heat source in said body for elevating the temperature of some of said pellets sufficiently to initiate an oxidation reaction between said some pellets and the coating thereon;

a controllable oxidant inlet for said oxidation chamber; and

an oxidant supply chamber connected to said inlet for controlled supply of a lithium oxidant to said oxidation chamber to maintain an oxidation reaction with the lithium once it is initiated.

4,714,052

INDUSTRIAL GAS OPERATED LIQUID HEATER

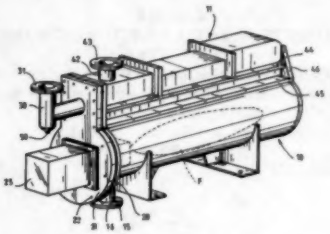
Jean-Pierre Gilfaut, Saint Andre d'Apchon; André Peze, St Leger S/Roanne; Jean-Paul Ravillard, and Jean-Claude Thevenet, both of Roanne, all of France, assignors to Barriquand, Roanne, France

Filed May 30, 1986, Ser. No. 868,946

Claims priority, application France, May 31, 1985, 85 08201

Int. Cl.[4] F22B *7/12*

U.S. Cl. 122—149 **12 Claims**



1. An industrial gas operated liquid heater comprising a tubular hearth, a gas burner connected to a front end face of said hearth so that the hearth defines a first path of travel for combustion fumes emanating from said burner, a heat exchanger connected to said tubular hearth and forming therewith a one-piece unitary assembly, said heat exchanger comprising a plurality of spaced apart chambers extending longitudinally adjacent to said hearth and communicatively connected thereto so as to provide a plurality of discrete second paths of travel for combustion fumes issuing from the tubular hearth while defining between adjacent chambers a plurality of channels for passage of liquid in heat exchanging relation to said chambers, a shroud having portions surrounding said tubular hearth in spaced relation thereto so as to provide an annular space substantially enclosing said tubular hearth for accomodating liquid flow therethrough, said shroud additionally having portions surrounding said plurality of chambers and cooperating therewith to define the paths of liquid flow whereby liquids introduced into the heater flow through both the annular space surrounding the hearth and through said plurality channels of the heat exchanger in heat exchanging relation to the combustion fumes flowing through the hearth and through the chambers of the heat exchanger.

4,714,053

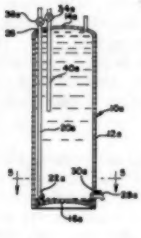
WATER HEATER CLEANING APPARATUS

Richard C. Perry, 905 Linden Ct., Western Springs, Ill. 60558

Filed Jul. 23, 1986, Ser. No. 888,352

Int. Cl.[4] F22B *37/50, 37/52*

U.S. Cl. 122—382 **5 Claims**



1. An apparatus for cleaning a residential or commercial water heater or the like without draining and refilling said heater, comprising a vertically-disposed water heater having a

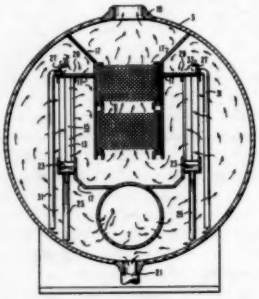
cylindrical side wall, a top, and a bottom; a first opening in said side wall and adjacent said bottom; a water supply tube which enters said first opening, said water supply tube terminating at a nozzle which permits entry of a stream of water in a generally horizontal spray pattern along said bottom for flushing and agitating any foreign matter along said bottom, and a drain cock within a second opening in said side wall and diametrically opposed to said first opening, said drain cock being open while flushing said tank bottom so that said foreign matter is removed through said drain cock.

4,714,054

MOISTURE TRAP FOR A MOISTURE SEPARATOR REHEATER

Paul G. Minard; James Alba, both of Winter Springs, and David A. Pacyna, Orlando, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 2, 1986, Ser. No. 847,337
Int. Cl.[4] F22G *1/00*
U.S. Cl. 122—483 **5 Claims**



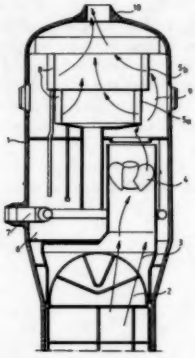
1. A moisture separator reheater comprising:
an elongated shell;
a steam inlet for influent moisture laden motive steam;
a reheater tube bundle extending lengthwise in a central portion of the elongated shell;
a plurality of chevron shaped vanes disposed side by side to form moisture separating means to remove entrained moisture from the motive steam passing therethrough;
a plurality of plates cooperatively associated with each other, the shell, the tube bundle, and the moisture separator means forming a barrier between the steam inlet and the reheater tube bundle so that all of the motive steam passes over the chevron shaped vanes before entering the reheater tube bundle;
at least one of the plates being disposed above the chevron shaped vanes and having a vertically extending wall portion to form a trough disposed above the chevron shaped vanes to collect moisture separated from the moisture laden motive steam as the motive steam flows through the shell from the steam inlet to the moisture separator means;
the vertically extending wall portion of the trough having an upper margin disposed above any moisture collected therein and having an additional wall portion which extends from the upper margin back over a portion of the trough;
a drain in the shell; and
draining means in fluid communication with the trough extending through the vertically extending wall portion and disposed to direct moisture collected in the trough to the drain in the shell and thereby preventing the moisture collected above the separator from forming droplets which drip down adjacent the inlet to the chevron shaped vanes and become reentrained in the motive steam thereby eroding the inlet ends of the chevron shaped vanes.

4,714,055

WATER AND STEAM SEPARATING DEVICE FOR DRYING MOIST STEAM

Patrick Sundheimer, Saint-Maur-des-Fosses, France, assignor to Framtome & Cie, Courbevoie, France

Filed Sep. 17, 1985, Ser. No. 777,132
Claims priority, application France, Sep. 17, 1984, 8414212
Int. Cl.[4] F22B *1/06*
U.S. Cl. 122—488 **3 Claims**



1. A device for separating water and steam for the drying of moist steam which has a rising current at the inlet and at the outlet of the separating device, said device comprising at least one assembly interposed in the path of the steam and formed by drying elements and a perforated vertical panel having an inlet side, which receives the moist steam which reaches, after having passed through the perforated panel, a zone enclosing the drying elements comprising baffles constituted by walls disposed in a general vertical direction and transverse with respect to the path of the steam for deviating the stream of steam, and troughs for recovering the water separated from the steam, disposed vertically and in such manner that their horizontal cross-sectional shape has a hollow part which faces toward the incident stream of steam, wherein the perforated vertical panel comprises a grid of expanded metal produced by the cutting of a sheet of metal followed by stretching of the sheet in the course of which the bands separating the cutout cells assume an identical inclination relative to the plane of the sheet and constitute inclined strips defining the cells, the grid being disposed so that the strips are downwardly inclined in the direction of the travel of the steam through the panel for the deflection of said steam so that its path is substantially horizontally or slightly downwardly inclined at the moment it comes into contact with the drying elements, the stream of steam having thus no vertically upwardly directed component of its speed vector when it comes into contact with the troughs.

4,714,056

TWO-CYCLE ENGINE

Takumi Tottori, Fujimi; Kenji Oki, Asaka; Kazuo Ooyama, Niiza, and Toshio Mizushima, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

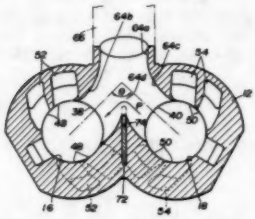
Filed Jul. 29, 1985, Ser. No. 760,306
Claims priority, application Japan, Aug. 3, 1984, 59-162791; Feb. 15, 1985, 60-27951; Feb. 15, 1985, 60-27953
Int. Cl.[4] F02B *75/02*
U.S. Cl. 123—65 PE **3 Claims**

1. A two-cycle engine comprising:
a cylinder block having at least one pair of first and second cylinders, said first and second cylinders having a pair of first and second exhaust ports, respectively;
a pair of first and second pistons received respectively in said

first and second cylinders for reciprocal movement therealong, each of said first and second exhaust ports being selectively closed and opened by a respective one of said first and second pistons during the movement thereof along a respective one of said cylinders;

crankshaft means to which said first and second pistons are operatively connected in such a manner that said first and second pistons are reciprocable 180° out of phase along the respective cylinders, a final portion of the duration of opening of one of said exhaust ports overlapping an initial portion of the duration of opening of the other;

exhaust passage means having means communicating said first and second exhaust ports with each other adjacent



thereto, said exhaust passage means comprising an exhaust manifold which has a pair of branch passages communicating respectively with said first and second exhaust ports at one end thereof and a main passage at which said pair of branch passages join together at the other ends thereof to provide a branched portion;

a partition wall member mounted on said cylinder block for movement into and out of said branched portion of said exhaust meanifold; and

actuator means operable to control the movement of said partition wall member in accordance with the engine speed at the final portion of the duration of opening of one of said exhaust ports.

4,714,057

VARIABLE VALVE CONTROL SYSTEM FOR A PISTON INTERNAL-COMBUSTION ENGINE

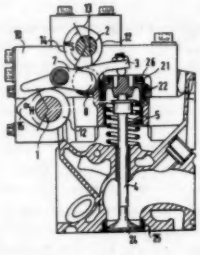
Klaus Wichart, Vienna, Austria, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany

Filed May 30, 1986, Ser. No. 868,711

Claims priority, application Fed. Rep. of Germany, May 30, 1985, 3519319

Int. Cl.[4] F01L *1/34*

U.S. Cl. 123—90.15 **13 Claims**



1. A variable valve control system including an internal-combustion engine, having an intake valve operable by valve lever means that can be pivoted around a shiftable bearing point, said system including:

continuously rotating lift camshaft means and continuously rotating control camshaft means for controlling the pivoting of the valve lever means;

phase-shifting means for phase-shifting the control camshaft means with respect to the lift camshaft means in response to operating parameters of the engine; and

a crank pivotably arranged at a stationary bearing point, wherein said valve lever means, is disposed on said crank;

wherein said control camshaft means rotates at the same speed as the lift camshaft means; and

wherein said valve lever means is pivoted against the force of valve spring means.

4,714,058

SPARK-IGNITED INTERNAL COMBUSTION ENGINE

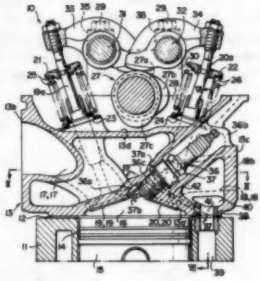
Hiroyuki Oda, and Akira Kageyama, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Dec. 2, 1985, Ser. No. 803,606

Claims priority, application Japan, Dec. 10, 1984, 59-261335; Dec. 14, 1984, 59-265085

Int. Cl.[4] F01P *3/02*; F01L *1/26*

U.S. Cl. 123—90.22 **13 Claims**



1. A spark-ignited engine comprising a cylinder block having at least one cylinder in which a piston is slidably received, and a cylinder head fixedly mounted on the cylinder block to form at least one combustion chamber therebetween, each combustion chamber being provided with a plurality of intake ports each of which is opened and closed by an intake valve, at least one exhaust port which is opened and closed by an exhaust valve and a spark plug screwed into a threaded plug hole formed in the cylinder head so that the igniting tip thereof projects into the combustion chamber wherein the improvement comprises at least one bore for forming a coolant passage provided in the wall of the cylinder head defining the combustion chamber to extend between the exhaust port and the plug hole, a single camshaft for driving the intake valve and the exhaust valve over the combustion chamber, wherein a plurality of the intake ports are located on one side with respect to the camshaft and the at least one exhaust port and the spark plug are located on another side with respect to the camshaft, and the coolant passage is a linear passage having one end communciating with a coolant inlet formed in the cylinder head through which coolant from the cylinder block enters the cylinder head, and another end opening into a water jacket above the combustion chamber.

4,714,059

SINGLE OVERHEAD CAMSHAFT ENGINE

Shuji Masuda, and Hiroyuki Oda, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 29, 1986, Ser. No. 857,064

Claims priority, application Japan, Apr. 30, 1985, 60-94504

Int. Cl.[4] F01L *1/26*

U.S. Cl. 123—90.23 **26 Claims**

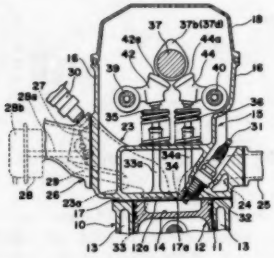
1. An internal combustion engine with single overhead camshaft which comprises:

a cylinder block having at least one cylinder bore defined therein and accommodating therein a piston for reciprocate movement in a direction parallel to the longitudinal axis of the cylinder bore;

a cylinder head mounted firmly on the cylinder block and having a bottom wall, said bottom wall defining a combustion chamber in cooperation with the piston and a wall of the cylinder block surrounding the cylinder bore, said combustion chamber having a volume variable in dependence on the movement of the piston within the cylinder bore, at least a surface area of the bottom wall which confronts the combustion chamber being a planar surface; said piston, having a flat top end face, confronting, and generally in parallel relationship with, the planar surface of the bottom wall of the cylinder head, and having a cavity defined in said flat top end face;

said bottom wall having a pair of intake ports defined therein for the introduction of intake gas into the combustion chamber, and also having a pair of exhaust ports defined therein for the discharge of exhaust gases from the combustion chamber;

separate intake valve means, one for each of the intake ports, for selectively opening and closing the respective intake ports, and separate exhaust valve means, one for each of the exhaust ports, for selectively opening and closing the respective exhaust ports generally in opposite sense to the selective opening and closing of the intake ports, all of said intake and exhaust valve means are supported by the cylinder head for movement in a direction generally perpendicular to the planar surface of the bottom wall;



a camshaft rotatably supported by the cylinder head above and between the intake valve means and the exhaust valve means so as to extend transversely of the longitudinal axis of the cylinder bore and having first and second cam means operatively associated respectively with the intake and exhaust valve means;

a support shaft means supported by the cylinder head;

first and second rocker arm means, swingably mounted on the support shaft means, and operatively associated respectively with the intake and exhaust valve means, the first rocker arm means being operable to transmit a movement of the first cam means on the camshaft to the intake valve means for driving said intake valve means, said second rocker arm means being operable to transmit a movement of the second cam means to the exhaust valve means for driving said exhaust valve means;

a generally elongated combustion aiding means constituted by an ignition plug or a fuel injector nozzle and supported by the cylinder head so as to incline relative to the planar surface of the bottom wall while extending intermediate between exhaust passage means communicated respectively with the exhaust ports, said combustion aiding means having one end exposed to the combustion chamber;

said support shaft means including a first support shaft for supporting the first rocker arm means and a second support shaft for supporting the second rocker arm means; said first and second support shafts being positioned on respective opposite sides of the camshaft adjacent the intake valve means and the exhaust valve means and arranged in symmetrical relation to each other, said second support shaft extending parallel to the camshaft, at least a portion of said combustion aiding means being positioned substantially directly below said second support shaft in a noninterfering relation with said second support shaft.

4,714,060

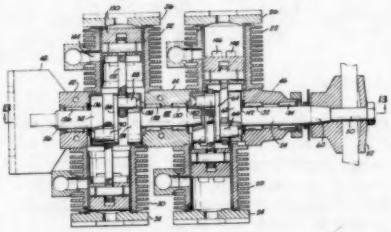
COMPOSITE ENGINE

Raymond P. Kesteloot, Lake Havasu, Ariz., assignor to R K W Industries, Inc., Balboa Island, Calif.

Filed Feb. 4, 1986, Ser. No. 825,859

Int. Cl.[4] F02F 7/00

U.S. Cl. 123—195 R **11 Claims**



1. A crankshaft for a composite engine, comprising

a first bearing shaft having a first main crank web at one end thereof;

a second bearing shaft having a second main crank web at one end thereof;

first and second intermediate crank webs each having first and second substantially identical crank pins positioned eccentrically and diametrically opposed therein and said first and second main crank webs including holes therein to receive respectively said first crank pins from said first and second intermediate crank webs; and

a third main crank web and an intermediate bearing shaft having a fourth main crank web at one end thereof, said third main crank web having a concentric hole therein to receive a second end opposite said one end of said intermediate bearing shaft and said third and fourth main crank webs including holes for receipt of said second crank pins.

10. A composite engine comprising

a crankshaft; and

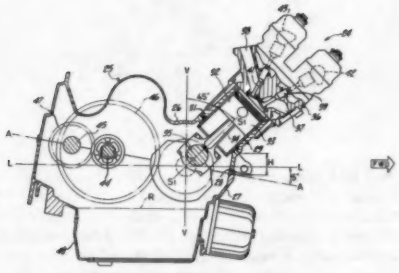
a crankcase rotatably supporting said crankshaft and including a main crankcase having a first mounting face at one end thereof normal to said crankshaft, an intermediate crankcase having a second mounting face thereof capable of mating with said first face and a third mounting face at a second end thereof, said second and third mounting faces being normal to a central crankshaft axis and a crankcase hub having a fourth mounting face capable of mating with said first mounting face and with said third mounting face, said second and fourth mounting faces having thrust shoulders normal to said crankshaft axis and said main crankcase and said intermediate crankcase each having an internal thrust shoulder, said internal thrust shoulder of said main crankcase being displaced from and facing in the same axial direction as said first mounting face and said internal thrust shoulder of said intermediate crankcase being displaced from and facing in the same direction as said third mounting face.

4,714,061

INLINE MULTIPLE CYLINDER ENGINE FOR MOTORCYCLES

Yoshiharu Nakayama, Hamamatsu, and Youichi Ohnishi, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Japan

Filed Jul. 29, 1985, Ser. No. 759,946
Claims priority, application Japan, Jul. 31, 1984, 59-160599
Int. Cl.⁴ B62D *61/02*
U.S. Cl. 123—195 R **7 Claims**



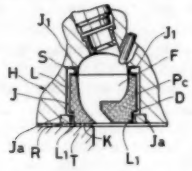
1. In a power plant of the type employed for powering a motor vehicle having a longitudinal axis comprising a main casing comprised of a lower member and an upper member having mating faces lying in a plane, an engine output shaft rotatable about a first forwardly disposed axis, and a change speed transmission having a primary shaft driven by said engine output shaft, and rotatable about a second axis parallel to said first axis, a secondary shaft rotatable about a third axis parallel to said first and said second axes and disposed rearwardly of said first and said second axes and gearing means driving said secondary shaft from said primary shaft, said first, second and third axes all lying in said plane, and a cylinder block affixed to said upper member of said main casing in proximity to the forward edge thereof, the improvement comprising said plan being inclined to the horizontal and extending downwardly in a forward direction so that said first axis lies below said second axis and said second axis lies below said third axis.

4,714,062

SUB-COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE

Shigetoshi Toeda, Kokubu, Japan, assignor to Kyocera Corporation, Kyoto, Japan

Continuation of Ser. No. 603,231, Apr. 23, 1984, abandoned. This application May 21, 1986, Ser. No. 870,294
Claims priority, application Japan, Apr. 27, 1983, 58-75648
Int. Cl.⁴ F02B *3/00*
U.S. Cl. 123—273 **8 Claims**



1. In a cylinder head in an internal combustion engine having a cylinder body to which the cylinder head is installed, with a gasket placed therebetween, the cylinder head including a pre-combustion chamber having a cylindrical portion for receiving a ceramic hot plug; and a ceramic hot plug disposed in said cylindrical portion of said pre-combustion chamber; the improvement comprising:

an annular shoulder in said pre-combustion chamber, said annular shoulder defining the upper end of said cylindrical portion of said pre-combustion chamber;

an annular elastic member disposed between said annular shoulder and the upper end of said ceramic hot plug and compressed therebetween;

the ceramic hot plug being shaped to conform to the cylindrical portion of the pre-combustion chamber so that a small clearance is provided between the ceramic hot plug and the peripheral wall of said pre-combustion chamber; and

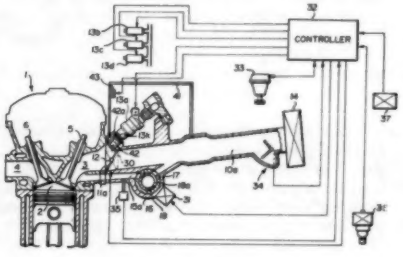
means for preventing said ceramic hot plug from dropping out of said cylindrical portion of said pre-combustion chamber prior to installation of the cylinder head on the cylinder body, wherein said means contacts said ceramic hot plug prior to installation of the cylinder head and, after installation of said cylinder head, the ceramic hot plug is urged toward the upper end of said cylindrical portion of the pre-combustion chamber so that a clearance is provided between said means and said ceramic hot plug and said ceramic hot plug is held between said elastic member and the gasket member disposed between said cylinder head and said cylinder body.

4,714,063

INTAKE SYSTEM FOR INTERNAL COMBUSTION ENGINE

Hiroyuki Oda; Akihito Nagao; Masanori Misumi; Akinori Yamashita, and Katsumi Okazaki, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Sep. 16, 1986, Ser. No. 907,996
Claims priority, application Japan, Sep. 17, 1985, 60-205786; Sep. 17, 1985, 60-205787; Sep. 17, 1985, 60-205788; Sep. 17, 1985, 60-205789
Int. Cl.⁴ F02B *31/00*
U.S. Cl. 123—308 **14 Claims**



1. An intake system for an internal combustion engine comprising a first valve means provided to open and close an intake passage leading to each combustion chamber, a bypass passage for introducing intake air into each combustion chamber bypassing the first valve means, and a second valve means provided to open and close the bypass passage, the first valve means being operated to close the intake passage in a light load range and to open the same in a heavy load range, and the second valve means being operated to close the bypass passage in the middle of each intake stroke, wherein the improvement comprises a first valve control means which controls the first valve means so that the opening of the intake passage is increased as the engine load increases after exceeding a predetermined value, and a second valve control means which controls the second valve means to delay the time the bypass passage is closed with increase in the engine load so that the time the bypass passage is opened substantially overlaps with the time

the intake valve is opened when the engine load reaches the predetermined value.

4,714,064

CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

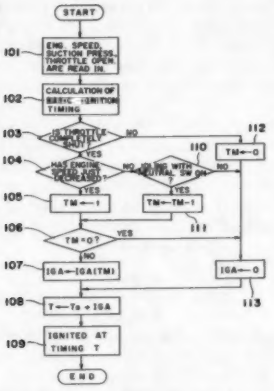
Shigeki Imazu, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 23, 1986, Ser. No. 854,864

Claims priority, application Japan, Apr. 25, 1985, 60-90162

Int. Cl.[4] F02M *3/07*; F02P *5/04*

U.S. Cl. 123—339 **7 Claims**



1. A control device for an internal combustion engine which comprises:

an ignition timing setting means for setting an ignition timing of said engine;

an idling detecting means for detecting an idling operating condition of said engine;

an idling speed control means for controlling the idling engine speed to a target speed by controlling the amount of intake air after having received a signal from said idling detecting means;

a deceleration detecting means for detecting whether said engine has decreased into an idle operating speed range; and

an ignition timing correcting means for advancing said ignition timing set by said ignition timing setting means relative to ordinary idling ignition timing when said engine has entered into said idling operating condition after detection of deceased speed of said engine by said deceleration detecting means by receiving said signal from said idling detecting means and a signal from said deceleration detecting means, said ignition timing correcting means maintaining the advanced ignition timing during a predetermined time of the idling operating condition of said engine.

4,714,065

METHOD AND DEVICE FOR SUPPLYING FUEL AND AIR TO AN INTERNAL COMBUSTION ENGINE

Felix G. Cascajosa, Madrid, Spain, assignor to Latimer N.V., Curacao, Netherlands Antilles

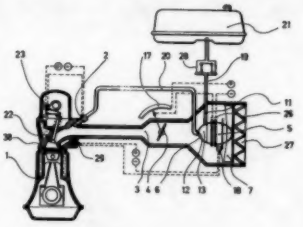
Filed Jun. 17, 1985, Ser. No. 745,871

Claims priority, application European Pat. Off., Aug. 14, 1984, 84109685

Int. Cl.[4] F02M *34/00*

U.S. Cl. 123—452 **28 Claims**

1. A device for supplying fuel and air to an internal combustion engine (1) comprising a fuel pump (13), the outlet (12) of which is connected to at least one injection nozzle (2) through a fuel line (20) and an air intake pipe (3) having disposed therein a throttle (4) and being provided with said injection valve (2) being characterized in a pump device (5) provided with two pump impellers (6, 7) which are arranged such that they are co-axial and adapted to be rotated about an ideal axis of rotation and which are disposed in separate flow channels (9, 10) and provided with co-operating pole carrier members



(*8a*, *8b*), said pump impellers constituting the contra-rotating parts of an electric motor, which does not have any output shaft and which exclusively drives said pump impellers (6, 7), the first pump impeller (6) being part of said fuel pump (13) and the second pump impeller (7) being designed as an air compressor impeller arranged in the area of the intake pipe (3).

4,714,066

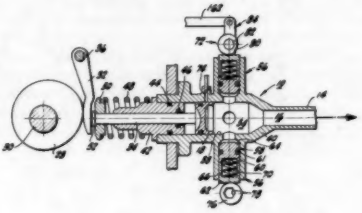
FUEL INJECTOR SYSTEM

Robert D. Jordan, 885 Carthage Ct., Concord, Calif. 94578

Filed Aug. 14, 1980, Ser. No. 178,142

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—447 **5 Claims**



1. An improved liquid injector system for combustion engines comprising:

a liquid pump mechanism having a liquid chamber with a reciprocal drive piston, said pump mechanism containing a drive liquid, and including a delivery conduit for said drive liquid;

means for connecting the reciprocal drive piston to a drive source for reciprocating said drive piston in said liquid chamber;

at least one control cylinder communicating with said liquid chamber, said control cylinder having a displaceable control piston for varying the effective volume of said liquid chamber and an input drive means operably connected to said control piston for displacing said control piston in said control cylinder in accordance with input variables, wherein periodic delivery of drive fluid in said delivery conduit is varied in accordance with displacement of said control piston in said control cylinder; and

a liquid injector mechanism connected to a liquid source, the injector mechanism having an injector nozzle and a cylinder with a displaceable power piston separating a first liquid chamber on one side of said piston and a second liquid chamber on the other side of said piston, said first chamber being connected to said delivery conduit of said pump mechanism and said second chamber being con-

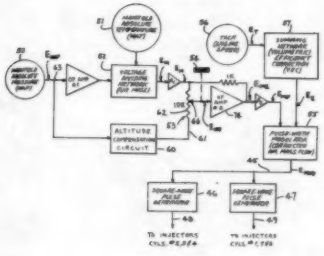
nected to said liquid source and to said injector nozzle, wherein periodic delivery of drive liquid to said first chamber generates displacements in power piston forcing fluid from said supply source through said injector nozzle; wherein said injector nozzle has an annular divergent orifice of predetermined maximum size, said nozzle being constructed with an inner displaceable stem having a displacement stop and a conically divergent end and constructed with a fluid passage with an inner stop seat and with an outer divergent wall coincident with said conically divergent end, said stem including bias means for biasing said displacement stop away from said stop seat when fluid is not forced through said injector nozzle by said power piston, said displacement stop being displaceable against said stop seat during high pressure fluid injection, said orifice being formed between said divergent end of said stem and said divergent wall upon displacement of said stem and engagement of said stop wherein said orifice has a predefined limited discharge area for discharge of fluid in particulate spray upon injection.

4,714,067

ELECTRONIC FUEL INJECTION CIRCUIT WITH ALTITUDE COMPENSATION

Richard E. Staerzl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Dec. 23, 1986, Ser. No. 946,189
Int. Cl.[4] F02D *41/34*
U.S. Cl. 123—494 **9 Claims**



1. In an electronic fuel-injection control circuit for an internal-combustion engine, wherein a manifold absolute pressure sensor and a manifold absolute temperature sensor feed signals through a combining network to the resistance element of a potentiometer having a variable tap from which a control voltage is derived as a function of desired throttle setting, the improvement wherein compensation means are provided coupled to said potentiometer for altering the relationship between said control voltage and said manifold absolute pressure sensor signal as a function of ambient atmospheric pressure.

4,714,068

METHOD AND DEVICE FOR CONTROLLING FUEL INJECTION QUANTITY OF ELECTRONIC CONTROL DIESEL ENGINE

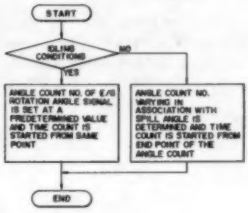
Masaomi Nagase, Toyota; Eiji Takemoto, Oobu; Noritaka Ibuki, Oogaki, and Takashi Hasegawa, Tajimi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 29, 1986, Ser. No. 868,097
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—506 **10 Claims**

1. A method of controlling a fuel injection quantity in an electronic control diesel engine, wherein said fuel injection quantity is controlled by an electromagnetic spill valve on-off operated at a target spill angle in accordance with an angle count number and a time count number of an engine rotation, based on an engine rotation angle signal outputted through a predetermined crank angle, comprising the steps of:

detecting whether idling conditions exist or not;

setting said angle count number of said engine rotation angle signal at a predetermined fixed value during detected idling conditions and starting a time count of said time count number from the end point of said predetermined


START
IDLING CONDITIONS
NO
YES
ANGLE COUNT NO. OF E/G ROTATION ANGLE SIGNAL IS SET AT A PREDETERMINED VALUE AND TIME COUNT IS STARTED FROM SAME POINT
ANGLE COUNT NO. VARYING IN ASSOCIATION WITH SPILL ANGLE IS DETERMINED AND TIME COUNT IS STARTED FROM END POINT OF THE ANGLE COUNT
END

fixed angle count number to on-off operate said electromagnetic spill valve; and

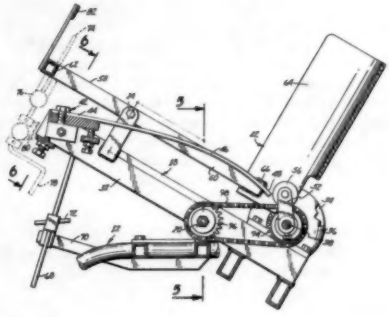
determining said angle count number varying in association with said target spill angle during detected non-idling conditions and starting said time count of said time count number from the end point of said angle count number to on-off operate said electromagnetic spill valve.

4,714,069

VOLLEYBALL SETTING MACHINE

Harold C. Ulrich, Box 282, Blooming Prairie, Minn. 55917

Filed Jun. 5, 1986, Ser. No. 871,062
Int. Cl.[4] F41B *7/00*
U.S. Cl. 124—26 **11 Claims**



1. A machine for projecting resilient balls upward into predetermined trajectories by mechanical impact, said machine including:

(a) a floor supported main frame;

(b) a propulsion assembly mounted to the main frame and including a power operated propulsion arm having a ball engaging forward end portion;

(c) a ball guide path assembly supported with respect to the main frame and including a ball positioning track adapted to position a ball-to-be-projected in a preferred aligned relation with respect to said forward end portion of the propulsion arm and including a discharge chute adapted to affect the trajectory of the ball after it has been projected by the propulsion arm;

(d) means for delivering a ball to be projected to said ball positioning track;

(e) said propulsion assembly including controllable means for initiating operation of the propulsion arm when the ball-to-be-projected is in said preferred aligned relation;

(f) wherein the propulsion assembly is adjustably mounted with respect to the main frame and the ball guide path assembly is mounted on the propulsion assembly; and

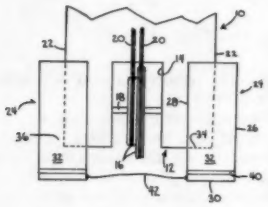
(g) adjustable propulsion assembly positioning means is provided between the propulsion assembly and the main frame to selectively vary the angular relation of the propulsion assembly to the main frame, thus to vary the angular relation of the guide path assembly to the floor.

4,714,070

GUARD FOR PROTECTING A COMPOUND BOX

Ronnie J. Shelton, 1826 E. Line, Sapulpa, Okla. 74066

Filed Jul. 25, 1986, Ser. No. 889,475
Int. Cl.[4] F41B 5/00
U.S. Cl. 124—86 9 Claims



1. A guard for attachment to a compound bow provided with a pair of limbs each having a pair of split limb end portions and a notch having a pulley transversely mounted therein, the split limb end portions each having a lateral edge surface and one end surface, said guard comprising:

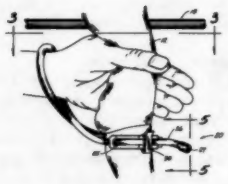
a pair of bodies each including a back surface and at least one end surface, the back surface including a cavity therein adapted to receive the lateral edge surface and the end surface of a split limb end portion of the compound bow, when one of said bodies is attached to each split limb end portion of a bow limb, the bodies extend a greater distance along the longitudinal axis of the bow limb from the split limb ends than the pulley, whereupon, when the compound bow is resting in an upright position on a horizontal surface upon the guard, the pulley is suspended from the surface protecting it from damage.

4,714,071

SLING ATTACHMENT TO AN ARCHERY BOW

Charles A. Saunders, 8380 - 36th Ave., Columbus, Nebr. 68601

Filed Dec. 8, 1986, Ser. No. 939,629
Int. Cl.[4] F41B 5/00
U.S. Cl. 124—88 5 Claims



1. A sling attachment for an archery bow of a type having a handle, a pair of limbs extending in opposite directions from said handle and a bow string interconnecting the outer ends of said limbs, said sling comprising:

a generally U-shaped bracket;

means for attaching a central portion of said U-shaped bracket to the front of said bow at a position just below said handle;

an elongated member having a first end and a second end;

first connecting means attached to one end of said U-shaped member for attaching said first end of said elongated member thereto, said first connecting means comprising two spaced apart holes extending therethrough, said one end of said elongated member extending through both of said holes;

second connecting means disposed on the other end of said U-shaped member, said second connecting means including an opening in the other end of said U-shaped member and having a portion of said elongated member slidably received through said opening; and

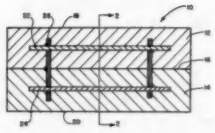
clip means attached to an intermediate portion of said U-shaped member, between said opening and said attaching means, for selectively holding said other end of said elongated member stationary with respect to said U-shaped bracket.

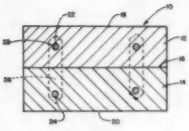
4,714,072

MECHANICALLY ATTACHED TWO COMPONENT CERAMIC FIBER SYSTEM

Fredrick H. Fidler, Evans, Ga., and Thomas B. Lowe, North Augusta, S.C., assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Jul. 18, 1986, Ser. No. 887,677
Int. Cl.[4] F24C 1/00
U.S. Cl. 126—1 F 16 Claims





1. Apparatus for attaching one layer of fibrous material comprising a first tubular member received in a first layer of fibrous material, a second tubular member received in a second layer of fibrous material, and means for connecting said first tubular member and said second tubular member including a link member having a pair of apertures therein to receive said first tubular member and said second tubular member.

4,714,073

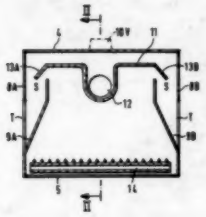
HEATING APPARATUS OPERATING WITH GASEOUS FUEL AND DESIGNED TO BE CONNECTED TO A SMOKE PIPE

Michel Hervé, Rosny sous Bois, France, assignor to S.A. Fonderies du Lion, Frasnes Lez Couvin, Belgium

Filed Jul. 30, 1986, Ser. No. 892,090
Int. Cl.[4] F24C 3/00
U.S. Cl. 126—91 R 7 Claims

1. Independent heating apparatus operating with gaseous fuels and designed to be connected by a discharge pipe to a smoke pipe, of the type comprising a heating body formed by a housing having a front wall, a rear wall, a pair of lateral end walls each provided with an opening, a top wall and a bottom wall equipped with an elongated burner disposed in a burner chamber in said housing, a backflow damping device in said housing and defining said chamber, and means for controlling both a gas flow to said burner and auxiliary apparatus for operation said heater, wherein said discharge pipe is horizon-

tally mounted on one of said walls of said heating body and said damping device comprises two siphons disposed symmetrically on either side of said discharge pipe, each siphon forming a passage between said chamber and said discharge pipe and the respective opening associated with the respective



siphon above the level of a horizontal axis of said pipe, said axis being disposed in a median transverse plane of said heating body and each of said siphons being disposed substantially in line with the respective opening formed in the corresponding lateral end wall, each opening being disposed near a respective end of said elongated burner.

4,714,074

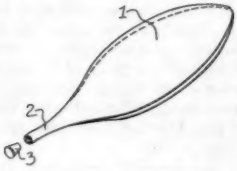
METHOD FOR PROTECTING HUMAN OR ANIMAL ORGANS AGAINST RADIATION

Pierre Rey, Lagny; Clement Abbou, Fontenay s/Bois; Jacqueline Leandri, Paris, and Alain J. P. R. Sezeur, Cachan, all of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed Jun. 28, 1985, Ser. No. 750,414

Int. Cl.[4] A61N *5/12*

U.S. Cl. 128—1.1 **15 Claims**



1. A method of treatment comprising placing in the body of a patient operated upon for a tumor, at the operating site, after excision or reduction of the tumor in the cavity left by the exeresis of the tumor, and prior to treatment by ionizing radiation, an elastomeric balloon which in an evacuated state is folded upon itself and relatively small in volume, filling the balloon to enlarge it into a substantially spherical form and to push aside adjacent tissues and organs surrounding the tumor site for freeing it from the presence of healthy tissues or organs which can be injured by ionizing radiation, and irradiating the tumor site with ionizing radiation from an external source while the balloon is in place.

4,714,075

BIOPSY CHANNEL FOR ENDOSCOPE

Allan I. Krauter, Syracuse, and Robert L. Vivenzio, Auburn, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Feb. 10, 1986, Ser. No. 828,134

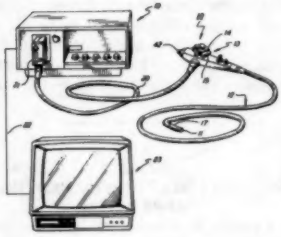
Int. Cl.[4] A61B *1/00*

U.S. Cl. 128—4 **4 Claims**

1. An endoscope including an insertion tube that is connected at its proximal end to a control housing and having a bendable steering unit for maneuvering a viewing head located at the distal end of the tube, the steering unit being located near the distal end of the insertion tube adjacent the viewing head, said endoscope further including

a lubricious biopsy channel passing through the inside of the insertion tube having a first tubular section contained within the steering unit that is joined to a second tubular section that passes back into the control housing,

said first section being formed of a bendable heat softenable thermoplastic material that is encircled by open mesh metal fabric,



said second section being formed of a stiffer plastic material that has a greater resistance to bending than the first section, and

the open mesh metal fabric having fibers that are at least partially embedded in the outer surface of the first section for reinforcing said section to prevent the section from closing when bent to a small radius.

4,714,076

DEVICE FOR THE SETTING OF BONE SEGMENTS

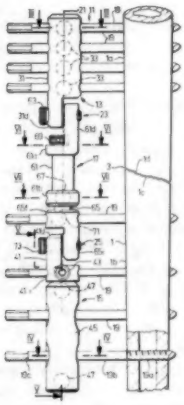
Pierre-Andre Comte, Liestal, Switzerland; Caius Burri, Ulm, Fed. Rep. of Germany; Lutz Claes, Ulm, Fed. Rep. of Germany; Heinz Gerngross, Ulm, Fed. Rep. of Germany, and Remy Meier, Bubendorf, Switzerland, assignors to Synthes, Paoli, Pa.

Filed Dec. 12, 1984, Ser. No. 680,664

Claims priority, application Switzerland, Jan. 19, 1984, 230/84

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—92 ZW **30 Claims**



1. A bone setting device comprising a plurality of pins for insertion into the bone fragments to be set, two elongated holders for retaining said pins, pin clamping means in said holders for clamping said pins, an elongated connecting link, each end of said link being hinged, with hinge means having a

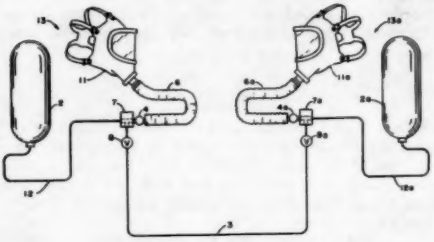
hinge bolt, to one of said holders and pivotable about an axis defined by the bolt and perpendicular to the longitudinal axes of the holders and the link, and holder clamping means for clamping said holders relative to said link at positions about said axes, at least one of said pin clamping means comprising a generally spherically shaped guiding body having at least one slot in its surface to provide compressibility in said body, a through hole in said body for receiving a pin and for enabling said pin to be pivoted in space, the holder in which the pin clamping means having the guiding body is positioned comprising two clamping elements each having at least one recess for receiving a portion of the guiding body and screw means for pressing said clamping elements together to compress and clamp the guiding body, said hinge means comprising tightening means enabling the holder to be locked to the link.

4,714,077

REPLENISHABLE SELF CONTAINED BREATHING APPARATUS

William M. Lambert, Pittsburgh, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Feb. 24, 1986, Ser. No. 832,371
Int. Cl.[4] A62B 9/04, 7/00
U.S. Cl. 128—202.27 **9 Claims**



1. A high pressure gas transfer system comprising a first and second breathing apparatus, each apparatus comprising,

a high pressure breathing gas tank having an outlet,

coupling means having a first opening fluidically connected to said outlet,

said coupling means having second and third openings, the second opening being an outlet from the apparatus,

pressure reducing means fluidically connected to said third opening, and

means fluidically connected to said pressure reducing means for delivering breathing gas to a user;

the pressure of breathing gas in the tank of said first apparatus being at a higher pressure than the pressure of breathing gas in the tank of said second apparatus,

a detachable high pressure conduit fluidically interconnecting the said second opening of the first apparatus with the said second opening of the second apparatus,

first valve means for selectively opening and closing the said second opening of the first apparatus, said first valve means for permitting flow from the tank of the first apparatus into the high pressure conduit when said first valve means is open,

second valve means for selectively opening and closing the said second opening of the second apparatus, said second valve means for permitting flow into the tank of the second apparatus from the high pressure conduit when said second valve means is open,

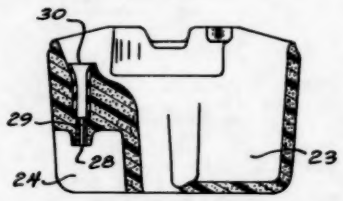
whereby breathing gas is transferred from the tank of the first apparatus to the tank of the second apparatus when the first and second valve means are opened.

4,714,078

INSERT FOR HEATED HUMIDIFIER USED IN RESPIRATORY THERAPY

Bernard R. Paluch, 500 Glenn Ave., Wheeling, Ill. 60090-6016

Continuation-in-part of Ser. No. 677,394, Dec. 3, 1984, abandoned. This application Jul. 9, 1986, Ser. No. 884,775
Int. Cl.[4] A61M 16/00
U.S. Cl. 128—203.17 **3 Claims**



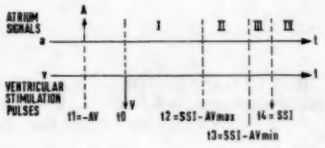
1. In a heated humidifier used in respiratory therapy consisting of a first reservoir removably attached to a cover, said cover having: (a) an inlet port for gas entry, said port being the upper terminus of a first conduit leading into a tower open at its bottom and top, the tower containing a perforated disc near the bottom of said tower, the first conduit terminating at and being in open communication with the underside of the disc, said disc acting to disperse the gas entering the inlet port; (b) a gas exit port, and; (c) a double well the improvement consisting of a solid removable, space filling, volume reducing insert for said first reservoir constructed of a noncompressible, nonabsorbent, sterilizable material contoured to fit said first reservoir and dimensioned so as to occupy at least 35% of the volume of the first reservoir, the insert formed with a depression, in open communication at its bottom surface with the first reservoir, acting as a second reservoir receivably accommodating the double well and tower, a chamber formed on a side of the the insert adjacent to the second reservoir, a second conduit extending from its lower terminus at the upper portion of the chamber through the body of the insert to its upper terminus at the top of the insert, a float valve pivotally connected at one end to the top of said chamber, said valve having means to positively close the lower terminus of the second conduit.

4,714,079

ATRIUM-CONTROLLED HEART PACEMAKER

Sven-Erik Hedberg, Kungsängen; Anders Lekholm, Bromma, and Anders Lindgren, Täby, all of Sweden, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 24, 1986, Ser. No. 910,998
Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535568
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—419 PG **3 Claims**



1. An atrial-controlled heart pacemaker operable with a maximum AV delay (AVmax), a minimum AV delay (AVmin) and a smallest synchronous interval (SSI) between two ventricular stimulation pulses comprising:

means for sensing an atrial event in said heart;

means for sensing a ventricular event in said heart;

means for supplying a ventricular pulse to said heart after an AV delay following a sensed atrial event;

means for controlling said means for supplying said ventricular pulse for operating said pacemaker in a DDD mode when said sensed atrial event occurs after a point in time SSI-AVmin, operating said pacemaker at a highest synchronous rate corresponding to said SSI when said sensed atrial event occurs between points in time SSI-AVmin and SSI-AVmax, and causing no ventricular stimulation pulse to be supplied when said sensed atrial event occurs before said point in time SSI-AVmax;

an AV control unit in said means for controlling, said AV control unit normally generating a signal upon the occurrence of each sensed atrial event for initiating generation of a ventricular pulse;

means for inhibiting the transmission of said sensed atrial event to said AV-control unit when said sensed atrial event occurs before said point in time SSI-AVmax;

a timer in said means for inhibiting, said timer having an input connected to said means for sensing said ventricular event, said timer assuming a first logic state at an output thereof for a period commencing with the occurrence with said ventricular event and concluding at said point in time SSI-AVmax, and thereafter assuming second logic state; and

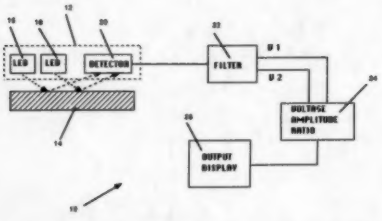
logic means in said means for inhibiting, said logic means having inputs connected to said means for sensing an atrial event and to said output of said timer, and having an output connected to an input of said AV control unit for preventing through-connection of said sensed atrial event to said input of said AV control unit while said output of said timer is in said first logic state.

4,714,080

METHOD AND APPARATUS FOR NONINVASIVE MONITORING OF ARTERIAL BLOOD OXYGEN SATURATION

Reuben W. Edgar, Jr.; Dennis W. Gilstad, and Ronald L. Branstetter, all of San Antonio, Tex., assignors to Nippon Colin Co., Ltd., Komaki, Japan

Filed Oct. 6, 1986, Ser. No. 915,688
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—633 **17 Claims**



1. A blood oxygen saturation monitoring system comprising:

a first source of electromagnetic radiation at a first wavelength;

a second source of electromagnetic radiation at a second wavelength;

means for positioning said first and second sources of electromagnetic radiation to illuminate a sample of blood;

sensing means for receiving electromagnetic radiation reflected by said sample of blood, said reflected electromagnetic radiation comprising an AC component and a DC component, said sensing means producing an output signal corresponding only to the AC components of the reflected portions of said first and second electromagnetic radiation;

means for producing a quotient of said AC voltage components; and

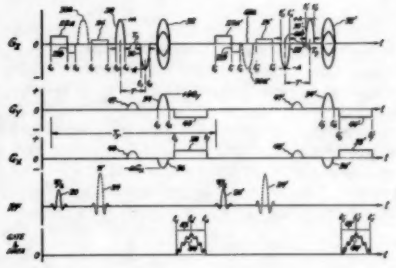
means for calculating blood oxygen saturation by correlating said quotient of said AC voltage components with an oxygen saturation reference curve, said reference curve being uniquely representative of the blood oxygen saturation characteristics of a particular individual.

4,714,081

METHODS FOR NMR ANGIOGRAPHY

Charles L. Dumoulin, Ballston Lake, and Howard R. Hart, Jr., Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,683
Int. Cl.[4] A61B 5/05
U.S. Cl. 128—653 **22 Claims**



1. A method for providing a nuclear magnetic resonance (NMR) angiographic projection image of flowing fluids in at least a selected portion of a sample, comprising the steps of:

(a) immersing the sample in a main static magnetic field;

(b) nutating, in the initial portion of each of a first sequence and a second sequence of a sequential pair of imaging sequences, the spins of all nuclei of a selected species;

(c) providing an evolution time interval after step (b) in each of the pair of sequences;

(d) applying, in the evolution time interval of at least one of the first and second sequences of each sequence pair, a pair of flow-encoding gradient field pulses in a first magnetic field gradient impressed upon the sample, in a first direction selected to establish one axis of the NMR angiographic projection image, to cause a resulting NMR response signal from the spin of moving nucleus to differ from the NMR response signal resulting from the spin of a substantially stationary nucleus;

(e) then applying a magnetic field gradient pulse in a second direction, orthogonal to the first direction, to dephase, and enhance suppression of, response signals from spins from all stationary nuclei of the selected species;

(f) then acquiring, responsive to at least a second magnetic field gradient impressed upon the sample in the second direction, a set of data from the NMR response signals evoked from at least the sample portion in each of a response data acquisition portion of the first and second sequences;

(g) substracting the data of one of the NMR response signal data sets acquired in the first and second sequences from the data of the other data set to substantially remove response data obtained from the substantially stationary nuclei; and

(h) generating, responsive to the remaining response data, the NMR angiographic projection image as a two-dimensional projection, lying in a plane in the first and second directions, of the fluid flow in the three-dimensional sample.

4,714,082

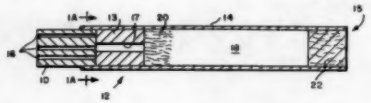
SMOKING ARTICLE

Chandra K. Banerjee, Pfafftown; Ernest G. Farrier; John H. Reynolds, IV, 1, both of Winston-Salem; Henry T. Ridings, Lewisville; Andrew J. Sensabaugh, Jr.; Michael D. Shannon, both of Winston-Salem, and Gary R. Shelar, Greensboro, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Continuation-in-part of Ser. No. 650,604, Sep. 14, 1984, Ser. No. 684,537, Dec. 21, 1984, and Ser. No. 769,532, Aug. 26, 1985. This application Oct. 23, 1985, Ser. No. 790,484

Int. Cl.[4] A24B *15/28;* A24D *1/18*

U.S. Cl. 131—359 103 Claims



1. A cigarette-type smoking article comprising:

(a) a combustible fuel element less than about 30 mm in length prior to smoking, having a density of at least about 0.5 g/cc;

(b) a physically separate aerosol generating means including an aerosol forming material in conductive heat exchange relationship with the fuel element; and

(c) means for delivering the aerosol produced by the aerosol generating means to the user.

4,714,083

MAKING OF MULTI-ELEMENT SMOKING ARTICLE ROD

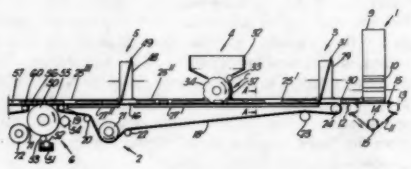
John A. Luke, Eastleigh, England, assignor to British-American Tobacco Company Limited, London, England

Filed Jan. 29, 1986, Ser. No. 823,597

Claims priority, application United Kingdom, Feb. 15, 1985, 8503956

Int. Cl.[4] A24C *5/47*

U.S. Cl. 131—94 10 Claims



1. A method of making multi-element smoking article rod of non-circular cross-section, wherein first rod lengths of non-circular cross-section are guided lengthwise along a first feed path, serially and in axial-orientation controlled manner, to and through an intercalating station, second rod lengths of a cross-section similar to that of said first rod lengths are guided lengthwise along a second feed path, serially and in axial-orientation controlled manner, to said station, said second rod lengths are intercalated with said first rod lengths at said station so that the intercalated second rod lengths are co-axial with adjacent first rod lengths and are disposed with an axial orientation common with that of said adjacent first rod lengths, and downstream of said station the rod lengths are guided lengthwise and co-axially along a third feed path, with maintenance of the common axial orientation of first and second rod lengths, to wrapping means, in operation of which wrapping means sheet wrapper material is applied to interattach first and second rod lengths; and wherein one of said first and second rod lengths are tobacco rod lengths.

4,714,084

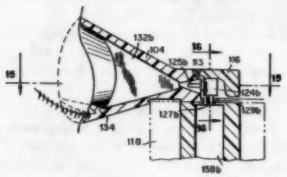
METHOD AND APPARATUS FOR SIMULTANEOUSLY APPLYING AND BLENDING MAKE-UP IN ONE STEP

Craig Berry, 69 Sylvan Rd. N., Westport, Conn. 06880, and Marc Bennett, 240 W. 15th St., New York, N.Y. 10011

Filed Oct. 16, 1985, Ser. No. 788,197

Int. Cl.[4] A45D *40/00, 40/30*

U.S. Cl. 132—88.7 25 Claims



1. A directional shield member for use in simultaneously applying and blending at least one spray or pigmented cosmetic in one step, which produces a gradient in the amount of at least one pigmented cosmetic on the skin, the directional shield member comprising:

a directional shield for defining a skin surface area upon which the pigmented cosmetics are deposited, disposed between at least one spray of pigmented cosmetic and the skin surface area upon which the pigmented cosmetics are to be deposited, and

at least one stencil wall for directing the spray of at least one pigmented cosmetic to produce the gradient.

4,714,085

COSMETIC STICK FOR A POWDER PENCIL

Reinhard von Kleinsorgen, Nuremberg, Fed. Rep. of Germany, assignor to Schwan-Stabilo Schwanhäusser GmbH & Co., Fed. Rep. of Germany

Filed Oct. 26, 1983, Ser. No. 545,633

Claims priority, application Fed. Rep. of Germany, May 6, 1983, 8313487[U]

Int. Cl.[4] A45D *40/20;* A61K *7/02*

U.S. Cl. 132—88.7 12 Claims

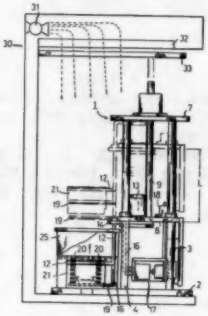
1. A cosmetic stick for an elongate powder pencil for directly applying powder to the skin, having a stable stick body comprising powder base material, pigment and, optionally, a binding agent and an adhesion-enhancing agent, wherein the stick body is formed from at least two elongate stick portions which are joined together over their length and of which one portion contains a pigment or pigments differing in color from the pigment or pigments contained in the other portion, and wherein said portion, in addition to said powder base material, pigment and, optionally, said binding agent and said adhesion-enhancing agent, contains particulate material comprising particles which are of greater hardness than the particles of said powder base material and which are of a particle size of between 10 and 100μ.

4,714,086

APPARATUS FOR WASHING AND DRYING SUBSTRATES

Yoshifumi Kishida, Nara, and Masayoshi Takeuchi, Akishima, both of Japan, assignors to Sharp Corporation and Dainichi Shoji Co., Ltd., both of, Japan

Division of Ser. No. 724,029, Apr. 17, 1985, Pat. No. 4,643,774. This application Sep. 25, 1986, Ser. No. 911,427
Claims priority, application Japan, Apr. 19, 1984, 59-077516
Int. Cl.[4] B08B *3/10*
U.S. Cl. 134—83 **7 Claims**



1. An apparatus for washing and drying a substrate comprising:

a movable base;

stud means along which said base is arranged to be substantially vertically movable;

a carrier for receiving at least one substrate therein;

clamping means arranged on said movable base for clamping said carrier;

oscillating means arranged on said movable base for oscillating the substrate;

a wash liquid vessel for immersing said carrier therewithin; and

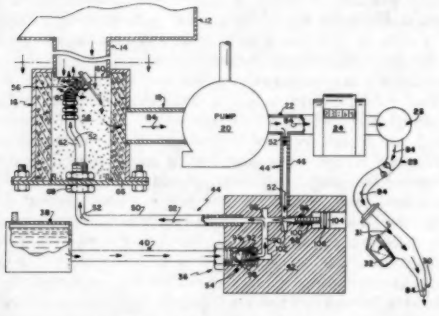
means for feeding drying gas to the substrate received in said carrier during drawing-up of said carrier from said vessel while being oscillated.

4,714,087

FUEL ADDITIVE PROPORTIONING APPARATUS AND METHOD

Jamieson B. Jones, 188 Drum Hill Rd., Wilton, Conn. 06897

Filed Mar. 27, 1987, Ser. No. 31,510
Int. Cl.[4] G05D *11/03*
U.S. Cl. 137—3 **25 Claims**



23. A method for delivering a fuel additive to a fuel flowing through a pump from an upstream side to a discharge side thereof for flow through a dispenser controlled by a dispensing valve, the method comprising:

(a) passing a portion of the fuel from said discharge side along a bypass path through a flow control back to said upstream side, said flow control permitting flow therethrough only when fuel is being discharged through said dispensing valve; and

(b) in response to fuel flow through said flow control, supplying a controlled amount of said fuel additive into said fuel portion in said bypass path,

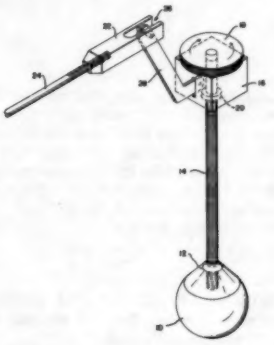
whereby said additive is supplied only when fuel is being discharged through said dispensing valve.

4,714,088

WATER SAVING FLOAT FOR A WATER TANK

James M. Ivins, Box 10-20, St. Michaels, Md. 21663

Filed May 29, 1987, Ser. No. 55,357
Int. Cl.[4] F16K *31/18, 31/28, 33/00*
U.S. Cl. 137—426 **15 Claims**



1. A water saving float assembly for selecting various water levels in a water closet which comprises: a float means, a threaded rod upon which said float means is adjustably secured for determining the various water levels, a link connecting block through which a portion of said rod extends for adjusting the height of said float, an adjusting wheel secured to said rod above said link connecting block and the water levels for controlling the adjustable height of said rod, a connecting link secured at one end to said link connecting block, a connecting adaptor for connecting another end of said connecting link, said adaptor being adjustably connected to a valve control rod of a water control valve whereby the amount or water allowed to flow into said water closet will be controlled by the adjustment of said float means as a result of the above adjustable elements.

4,714,089

ELECTROMAGNETIC PROPORTIONAL CONTROL VALVE

Kazuhiro Ueda; Toshiaki Yamaguchi; Kouji Kajiyama, all of Wakayama, and Osamu Matsumoto, Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 28, 1986, Ser. No. 901,369
Claims priority, application Japan, Oct. 3, 1985, 60-220643
Int. Cl.[4] F16K *31/06, 47/08*
U.S. Cl. 137—614.18 **4 Claims**

1. An electromagnetic proportional control valve comprising:

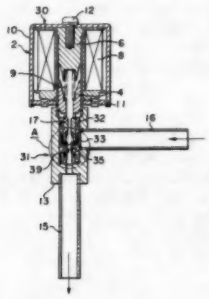
a control valve main body having fluid inlet means and fluid outlet means;

a sleeve in said main body and having a slit in communication with said inlet means;

a valve seat in said sleeve at a position such that a fluid passageway is defined from said inlet means through said slit, said valve seat and said outlet means, respectively;

a spool slidably fitted in said sleeve;

electromagnetic means connected to said spool for moving said spool to selectively close said slit in said sleeve, such that said spool comprises means for varying an opening



area of said fluid passageway, whereby fluid flow through said passageway may be controlled;

a ball movable with said spool and comprising means for sealingly matingly engaging with said valve seat when said spool is in a position for fully closing said slit; and

spring means for pressing said ball into tight mating engagement with said valve seat when said position is in said position for fully closing said slit.

4,714,090

MIXING APPARATUS FOR GASES

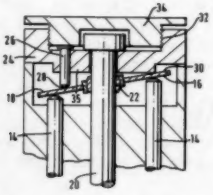
David C. Sampson, Cowling, England, assignor to The BOC Group plc, Windlesham, England

Filed Oct. 8, 1986, Ser. No. 916,357

Claims priority, application United Kingdom, Oct. 10, 1985, 8525058

Int. Cl.[4] F16K *11/00, 11/065*

U.S. Cl. 137—636 **8 Claims**



1. A gas machine for mixing a desired concentration of first and second gases for delivery to a patient, said machine comprising a valve body, said valve body having first and second valves each having a valve stem the axial movement of which controls the flow of the first and second gases through their respective first and second valves, each valve stem having one end engaging a control surface of a thrust plate mounted for axial and pivotal movement on a support shaft, a bearing means surrounding said support shaft, said bearing means allows said thrust plate to pivot and slide axially along said support shaft, a first actuator means on said valve body having at least one variable plunger that is disposed within said first actuator means and being separate from said thrust plate but in abutting engagement with said thrust plate, said first actuator means variably moving the plunger selectively along the control surface of said thrust plate for pivoting the thrust plate about said shaft so that one valve stem is moved axially relative to the other thereby increasing the rate of flow of one gas through its respective valve whilst concomitantly decreasing the rate of flow of the other gas through its respective valve to vary the relative proportions of the gases without varying their total flow rate, and a second actuator means disposed within said first actuator means for adjustably engaging and abutting said at least one plunger for moving the thrust plate axially along said shaft towards and away from the valve stems thereby to vary the total rate of flow of the gases without varying the relative proportion of each gas flowing through its respective valve.

4,714,091

MODULAR GAS HANDLING APPARATUS

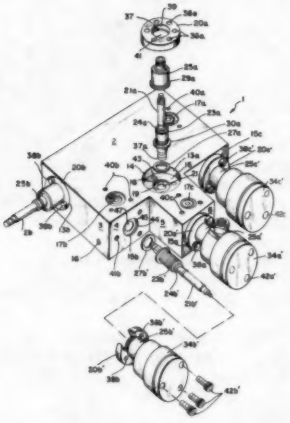
Wilfried R. Wagner, Basking Ridge, N.J., assignor to Emcore, Inc., South Plainfield, N.J.

Continuation of Ser. No. 743,317, Jun. 10, 1985, abandoned.

This application Sep. 3, 1986, Ser. No. 903,885

Int. Cl.[4] F16K *11/10*

U.S. Cl. 137—884 **38 Claims**

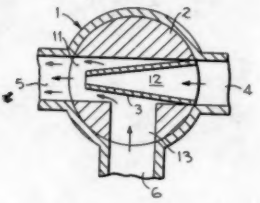


1. Apparatus for handling gaseous streams comprising a unitary modular flow block including a first valve passage extending into said modular flow block, said first valve passage including a first valve entrance aperture and a first valve seat, whereby a first valve including a reciprocating valve shaft mounted in said first valve passage can selectively open and close said first valve seat, a second valve passage extending into said modular flow block, said second valve passage including a second valve entrance aperture and a second valve seat, whereby a second valve including a reciprocating valve shaft mounted in said second valve passage can selectively open and close said second valve seat, a first gas flow path extending through said modular flow block along a first predetermined path which includes a portion connecting said first valve seat with said second valve passage at a predetermined location between said second valve seat and said second valve entrance aperture, and a second gas flow path extending through said modular flow block along a second predetermined path which includes said second valve seat, whereby closing of said first valve seat closes said first gas flow path and closing of said second valve seat closes said second gas flow path, while a gas flowing through said first gas flow path can flush said predetermined location in said second valve passage even when said second valve seat has been closed and flushing of said second valve seat can be controlled by said first valve.

4,714,092
BALL VALVE AND FLOWING FLUID PRESSURE AMPLIFIER

George S. Sanders, Las Vegas, Nev., assignor to Agricultural Aviation Engineering Company, Las Vegas, Nev.

Filed Feb. 2, 1987, Ser. No. 9,886
Int. Cl.[4] F16K *11/087*
U.S. Cl. 137—894 12 Claims



1. A ball valve assembly comprising:

a housing;

a ball rotatably mountable within said housing about an axis of the ball about which any cross-section thereof has a uniform outline curve, said ball defining therewithin:

a first passage of uniform cross-sectional shape and area extending through the ball with the central axis through said first passage being substantially perpendicular to the rotational axis of the ball; and

a second passage of uniform cross-sectional shape and area opening into said first passage from one side of the ball with the central axis through said second passage being substantially perpendicular to the rotational axis of the ball; and

a tapered tubular section in which the inner and outer dimensions vary over its length with the outer shape and dimensions of the larger end thereof being substantially the same as the inner shape and dimensios of one end of said first passage to be captured therewithin with the smaller end of the tubular section extending toward the other end of said first passage to define a tapering annular cavity between the inner walls of said first passage and the outer walls of the tapered tubular section, said cavity tapering into the ball from the other end of first passage with said second passage in communication with said cavity;

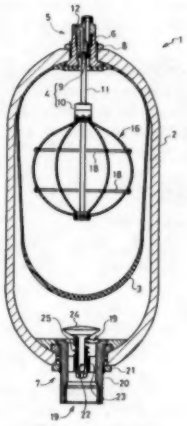
said housing defining first and second ports for communicating with opposite ends of said first passage and a third port for communicating with the second passage or being closed by the solid surface of the ball in response to the rotation of the ball, said third port also being disposed to communicate with the second passage when said first and second ports are in communication with said one and other ends of the first passage, respectively,

said first port conducting fluid under pressure into said first passage, said third port conducting fluid into said second passage when said first and second ports are in communication with said first passage and said second passage is in communication with said third port, said tapered tubular section increasing the velocity of fluid flow through said first passage to create a negative pressure in said tapering annular cavity for inducing fluid in said second passage to flow into said first passage when said first and second ports are in communication with opposite ends of said first passage and said second passage is in communication with said third port, said second port discharging therefrom atomized fluid by the shearing action of the increased velocity of said fluid under pressure when said first and second ports are in communicatio with opposite ends of said first passage and said second passage is in communication with said third port, said first passage being cleansed of fluid remaining therein which was induced from said second passage when said first and second ports are in communication with said first passage and said third port is closed by the solid surface of the ball.

4,714,093
BLADDER TYPE FLUID ACCUMULATOR FOR HYDRAULIC SYSTEM

Hiroshige Kawano, Amagasaki, Japan, assignor to Nakamura Koki Co., Ltd., Hyogo, Japan

Filed Aug. 1, 1986, Ser. No. 891,966
Claims priority, application Japan, Aug. 3, 1985, 60-171356
Int. Cl.[4] F16L *55/04*
U.S. Cl. 138—30 13 Claims



1. A bladder-type accumulator for accumulating pressurized hydraulic fluid in a hydraulic system, comprising:

a containment means for accumulating the hydraulic fluid by receiving the same;

a collapsible bladder capable of internal pressurization, disposed within the containment means such that the accumulated fluid occupies space between an outside surface of the bladder wall and an inside surface of the containment means, the wall of said bladder moving in correspondence with a pressure differential across the collapsible bladder wall;

a bladder condition detecting means disposed within the bladder for actuation by movement of the collapsible bladder walls;

the detecting means comprising a tube, a slider moved along the tube in response to movement of the collapsible bladder wall; and, detecting switch means disposed in said tube for detecting movement of said slider with respect thereto.

4,714,094
GAS-OIL PRESSURE ACCUMULATOR

Constantino Tovagliaro, Milan, Italy, assignor to Magnaghi Oleodinamica S.p.A., Milan, Italy

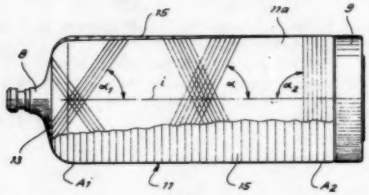
Filed May 23, 1986, Ser. No. 867,339
Claims priority, application Italy, May 30, 1985, 20963 A/85
Int. Cl.[4] F16L *55/04;* B65D *8/08*
U.S. Cl. 138—31 4 Claims

1. A gas-oil pressure accumulator comprising:

a cylindrical body having closable ends and at least one of which is formed with a cap, said body defining a cylinder; and

a piston slidable in said cylinder and subdividing the interior of said cylinder into a liquid-containing chamber and into a gas-containing chamber adapted to be pressurized, said body being formed of an internal core and a thin metallic

material secured to said cap and an envelope of composite material of high-strength fibers impregnated with synthetic resin, said high-strength fibers being provided in a principal layer having a helical arrangement of variable pitch over a cylindrical portion of said body, and a sec-



ondary layer of fibers having a circumferential arrangement and a thickness that decreases from a junction zone between said cap and said cylindrical portion to a zone at an end of said body opposite that at which said cap is provided.

4,714,095

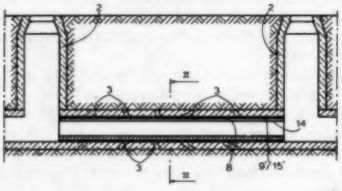
METHOD OF SALVAGING A PIPE CONDUIT BURIED UNDER GROUND

Hans Müller, Brauergildestrasse 5, 4938 Schieder-Schwalenberg, and Hermann Suerbaum, Schieder-Schwalenberg, both of Fed. Rep. of Germany, assignors to Hans Müller, Schieder-Schwalenberg, Fed. Rep. of Germany

Filed Nov. 13, 1986, Ser. No. 930,658

Int. Cl.[4] F16L *55/16;* **B29C** *17/00*

U.S. Cl. 138—98 **11 Claims**



1. A method of salvaging a conduit which is buried under ground, especially a sewer pipe, comprising the steps of

permeating resin-absorbing inner layer of a lining hose, which further includes an impermeable outer layer that outwardly adjoins and surrounds the inner layer, with one resin;

placing the lining hose into the conduit;

providing a surface region of a calibrating hose which is to contact the inner layer of the lining hose with a layer containing another resin;

shaping the lining hose to conformingly line the conduit, including introducing the calibrating hose into the lining hose in such a manner that the resin-containing layer of the calibrating hose contacts the inner layer of the lining hose and pressing the calibrating hose against the lining hose to urge the latter against the conduit; and

hardening at least one of the first and second resins.

4,714,096

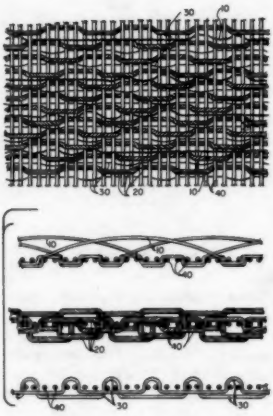
ELASTIC FABRIC PROVIDED WITH A LOOPED GRIPPING SURFACE

Normand D. Guay, Westerly, R.I., assignor to George C. Moore Co., Westerly, R.I.

Filed Dec. 3, 1985, Ser. No. 804,271

Int. Cl.[4] D03D *27/04, 15/08;* **A44B** *18/00*

U.S. Cl. 139—391 **8 Claims**



1. An elastic fabric comprising:

a plurality of texturized multifilament warp loop yarns for forming upwardly extending loops on the face surface of said fabric,

monofilament weft yarn interwoven with said loop yarns,

a plurality of elastomeric warp yarns interwoven with said loop yarns and with said weft yarn for providing elastic stretch of said fabric, and

a plurality of texturized warp back yarns interwoven with said loop and elastomeric warp yarns and with said weft yarn for forming the back surface of said fabric wherein said weft yarn is of a sufficiently heavy denier to maintain weftwise stability of said fabric in its stretched and unstretched condition.

4,714,097

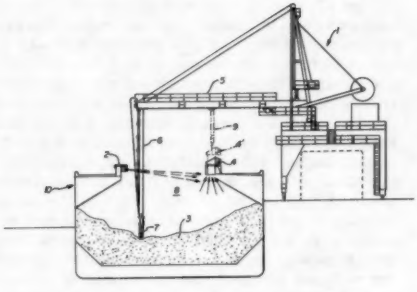
DUST CONTAINMENT SYSTEM FOR BULK CARGO CONTAINERS

Willard Binzen, Gibsonia, Pa., and Robert S. Catan, Greenlawn, N.Y., assignors to Dravo Corporation, Pittsburgh, Pa.

Filed Oct. 14, 1986, Ser. No. 918,537

Int. Cl.[4] B65B *1/04*

U.S. Cl. 141—5 **15 Claims**



11. A method for containing dust-like particulate material

within the hold of a bulk cargo container during loading and unloading operations, said method comprising the steps of:

establishing a plurality of spaced-apart, coherent primary air streams at one side of an open hatch of said cargo hold and directing said primary air streams across the top of said cargo hold along a substantially horizontal pathway, each of said primary air streams creating a secondary air stream therearound which gradually diverge, forming a substantially continuous stream of air across the top of the cargo hold;

capturing fugitive, dust-like particulate material and entraining said particulates within said horizontal stream of air;

collecting said horizontal stream of air and said entrained particulate material at an opposite side of said cargo hold from said source of primary air streams;

filtering said entrained particulate material from the horizontal air stream;

exhausting said filtered air stream to the atmosphere; and

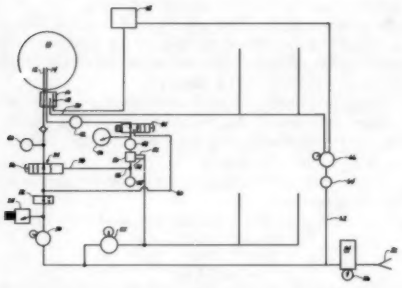
returning said collected particulate material to said cargo hold.

4,714,098

BALL INFLATION APPARATUS

Robert W. Stuckel, 1385 Howard St., Elk Grove Village, Ill. 60007

Filed Jun. 8, 1983, Ser. No. 501,991
Int. Cl.[4] A63B *41/00*
U.S. Cl. 141—85 **6 Claims**



1. An apparatus for inflating a hollow object comprising:

(a) a reference source of fluidic pressure;

(b) a first fluid conduit connected to said reference pressure source for transmitting fluid under pressure to said object;

(c) a second fluid conduit arranged coaxially with said first fluid conduit for transmitting fluid under pressure from said object;

(d) pressure control means fluidically connected between said reference pressure source and said first fluid conduit for controlling pressure to said first fluid conduit in response to a pressure signal; and

(e) sensing means fluidically connected to said second fluid conduit for sensing pressure therein and fluidically connected to said pressure control means for actuation thereof, comprising: a first chamber having a first flexible diaphragm mounted therein, and wherein sensed pressure is provided to one side of said first diaphragm and reference pressure is provided to the other side of said first diaphragm from said reference pressure source, and further comprising an outlet for passing fluid under pressure from said reference pressure source when said sensed pressure is less than said reference pressure, said outlet being arranged to be closed by said first diaphragm when said sensed pressure is greater than said reference pressure; and wherein said sensing means further comprises a second chamber having a flexible second diaphragm mounted therein and wherein pressure from the said outlet of said first chamber is provided to one side of said second diaphragm in said second chamber, and reference pressure is provided to the other side of said second diaphragm in said second chamber, and further comprising an outlet for passing fluid under pressure from said reference pressure source and arranged to be closed by said second diaphragm when said pressure from said outlet of said first chamber is greater than said reference pressure,

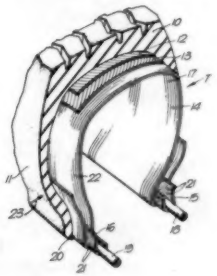
whereby a pressure signal is generated to actuate said pressure control means when said sensed pressure exceeds said reference pressure.

4,714,099

VEHICLE AND TIRE THEREFORE

James N. McGlashen, Winstanley, England, assignor to Apsley Metals Limited, United Kingdom

Filed Mar. 31, 1986, Ser. No. 846,215
Claims priority, application United Kingdom, Apr. 9, 1985, 8509003
Int. Cl.[4] B60C *15/06*
U.S. Cl. 152—523 **1 Claim**



1. A pneumatic tire having a pair of bead portions each of which is reinforced by a bead core and at least one bead reinforcing ply having bead reinforcing cords therein that are substantially parallel with each other and aligned in the same direction with respect to a relative rotational direction of the tire when mounted on a vehicle, the cords of the reinforcing plies in one bead portion being substantially parallel to the cords in the reinforcing plies in the other bead portion, said tire having a direction mark on an external surface related to the direction of the reinforcing cords in the bead reinforcing plies.

4,714,100

METHOD AND APPARATUS FOR CHANGING A MOLD BOX ON A MOLDING MACHINE

Kenneth E. Bellis, Rochester; Jackson E. Brown, Mt. Clemens, and Pheroze J. Nagarwalla, Rochester Hills, all of Mich., assignors to Roberts Corporation, Lansing, Mich.

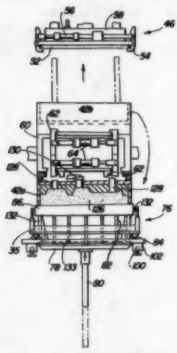
Filed Dec. 3, 1986, Ser. No. 937,579
Int. Cl.[4] B22C *11/04, 17/02, 25/00*
U.S. Cl. 164—18 **21 Claims**

1. Apparatus for changing a mold box (**42***a*) on a molding machine (**20**), said machine (**20**) being of the type including a rotatable frame (**60**), at least one mold box (**42***a*) on said frame (**60**) having a mold cavity therein for forming a mold (**126**) and being rotatable with said frame (**60**) from a molding position in which a mold (**126**) is formed in said mold cavity to a mold discharge position in which a mold (**126**) may be removed from said one mold box (**42***a*), means (**76**) for receiving and lowering said mold (**126**) from said one mold box (**42***a*) when said one mold box is in said discharge position thereof, and means (**84**) for transferring said mold (**126**) laterally from said receiving means (**76**) to an unloading position, comprising:

means (62, 64, 134) for releasably mounting said one mold box (42a) on said frame (60); and,

means (132) on said receiving means (76) for supporting said one mold box (42a) on said receiving means when said one box (42a) is released from said frame (60), whereby said one mold box (42a) may be vertically shifted by said mold receiving means (76) between a lowered position and a raised position in which said one mold box (42a) may be mounted or released from said frame (60).

13. A method for changing a mold box (42) on a molding machine (20), said molding machine (20) being of the type including a rotatable frame (60), at least one mold box (42a) on said frame having a mold cavity therein for forming a mold (126) and being rotatable with said frame (60) from a molding position in which a mold (126) is formed in said mold cavity to a mold discharge position in which a mold may be removed



from said one mold box (42a), means (76) for receiving and lowering said mold (126) from said one mold box (42a) when said one mold box (42a) is in said discharge position thereof, means (84) for transferring said mold (126) laterally away from said receiving means (76) to an unloading position, and a reciprocable press head (46) including a press plate (52) for compressing molding material within said mold cavity, comprising the steps of:

(A) raising said mold receiving means (76) to an elevated position engaging said one mold box (42a);

(B) releasing said one mold box (42a) from said frame (60);

(C) supporting said one mold box (42a) on said mold receiving means (76);

(D) lowering said mold receiving means (76) with said one mold box (42a) supported thereon; and

(E) removing said one mold box (42a) from said mold receiving means (76).

4,714,101

METHOD AND APPARATUS FOR EPITAXIAL SOLIDIFICATION

Bruce E. Terkelsen, Cheshire, Conn., assignor to United Technologies Corporation, Hartford, Conn.

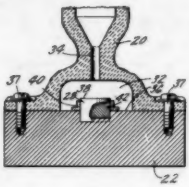
Continuation of Ser. No. 250,521, Apr. 2, 1981, abandoned, which is a continuation of Ser. No. 121,567, Feb. 14, 1980, abandoned, which is a continuation-in-part of Ser. No. 969,130, Dec. 13, 1978, abandoned. This application Sep. 29, 1986, Ser. No. 913,834

Int. Cl.⁴ B22D *27/04*

U.S. Cl. 164—122.2 **13 Claims**

1. For epitaxially casting metal, apparatus comprised of a chill plate, a mold in contact with the chill plate and a seed positioned on the chill plate; the mold having in a substantially vertical array an article cavity and a starter cavity, the starter cavity connected to the article cavity by a selector cavity of substantially smaller dimension than that of the starter cavity; the mold further having means for introducing molten metal into its cavities; characterized in that a portion of the seed is positioned within the mold starter cavity, the portion having a first surface aligned with the entrance to the selector cavity to enable epitaxial solidification from the first surface into the selectory cavity; and the starter cavity having substantially greater volume than the volume of the portion of the seed contained therein, to provide within the starter cavity a reservoir for metal which may be flowed across the seed; the seed projected into the starter cavity to enable molten metal to surround the seed at a second surface in addition to the first surface to provide additional heating to the seed; the seed having a barrier layer at the second surface, to prevent molten metal from adhering to the seed and to facilitate its removal from the solidified casting.

11. The method of casting metals into an article having controlled crystallographic orientation using a seed and a chill plate which comprises:



(a) placing a cold seed on the lateral surface of a cold chill plate so the seed projects above the surface of the chill plate with a controlled orientation thereto;

(b) heating a mold and then placing it on the chill plate with a controlled orientation thereto, so the seed is contained within a cavity of the mold and so there is created a lateral space cavity surrounding the seed;

(c) filling the mold with molten metal in a manner which causes a portion of the molten metal to flow across the part of the seed projecting from the chill plate, to heat and melt a portion of the seed;

(d) flowing the metal which sweeps across the seed into said lateral space cavity; and

(e) epitaxially solidifying the molten metal from the seed.

4,714,102

CASTING METHOD AND AN APPARATUS THEREFOR

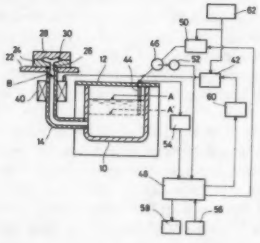
Hirokuni Koya, Zama, Japan, assignor to Toshiba Machine Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1987, Ser. No. 1,021

Claims priority, application Japan, Jan. 11, 1986, 61-002892; Jan. 11, 1986, 61-002893

Int. Cl.⁴ B22D *17/32*

U.S. Cl. 164—457 **4 Claims**



1. A casting method for use with a retaining furnace for molten material which communicates with a mold through a supply conduit having an electromagnetic induction pump for impelling a molten material from the retaining furnace through the supply conduit directly into a cavity of a mold at low

pressure, the method comprising providing in the retaining furnace a level-detecting sensor which is vertically movable by means of a servo-motor and generates a signal of the detected level, coupling the servo-motor to a pulse generator for generating a signal of the position of the level of the molten material, storing in a computer data relative to a predetermined injection pressure and variations thereof to determine optimum casting conditions of the molten material, inputting into the computer the detected level signal from the level detecting sensor in the form of a level position signal from the pulse generator for computing the optimum injecting conditions, and outputting from the computer a control instruction to a voltage control device of the electromagnetic induction pump such as to maintain constant the melt level in the supplying conduit between casting operations regardless of variation in the melt level of the furnace.

3. A casting apparatus for use with a retaining furnace for a molten material, which retaining furnace communicates with a mold through a supply conduit, the supply conduit having an electromagnetic induction pump for impelling molten material from the retaining furnace through the supply conduit directly into a cavity of a mold at a low pressure, the retaining furnace having therein a level-detecting sensor which is vertically movable, a servo-motor for vertically moving the sensor, said sensor generating a signal of the detected level of molten material in the furnace, a converter for outputting the detected level signal and a pulse generator coupled with the servo-motor for generating a signal of the level position of said level sensor, a computer and controlling means for previously storing data relative to injection pressure and a variation thereof to achieve optimum casting conditions of the molten material, means for inputting the detected level signal from the level-detecting sensor in the form of the level position signal from the pulse generator for computing the optimum injecting conditions, and means for outputting a control instruction from the computer to a voltage control device of the electromagnetic induction pump so as to maintain constant the melt level in the supply conduit regardless of variations in the melt level in the furnace between casting operations.

4,714,103

CONTINUOUS CASTING MOLD

Raymond L. Polick, Pittsburgh; Kenneth D. Tamburrino, Aliquippa, both of Pa., and Edmund H. Becker, Schwerte, Fed. Rep. of Germany, assignors to Mannesmann Demag Corporation, Coraopolis, Pa.

Filed Oct. 10, 1986, Ser. No. 917,705
Int. Cl.[4] B22D *11/124*
U.S. Cl. 164—486 **14 Claims**

1. A device in the continuous casting of molten metal comprising:

a mold assembly, comprising:

mold member means having a wall cavity throughout with opposed opened ends, one end for receiving said molten metal and the other end for progressively discharging said metal in a cast form which cast form has an outer surface which separates away from said wall cavity upon solidification thereof,

said mold member means including at least two different lengths of mold members,

first cooling means disposed around said mold member means for receiving and distributing coolant to effect said solidification of said molten metal,

fluid inlet means for introducing said coolant into said mold assembly,

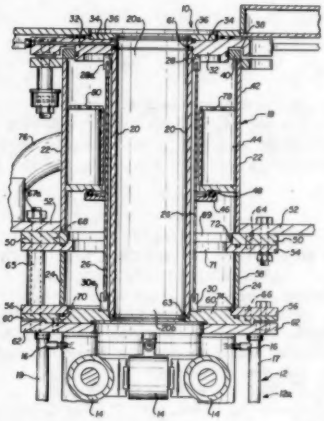
said first cooling means having inner wall means disposed around and adjacent to said mold member means between which said coolant travels,

said inner wall means including at least two different lengths of inner walls which correspond to that of said mold members,

annular extension means connectable to at least said first cooling means for extending the length of said mold assembly, and

mounting means in said mold assembly for said mold member means and said inner wall means of said first cooling means for replacement of said mold member and of said inner wall in said mold assembly with a different mold member and a different inner wall for said first cooling means, each being selected such as to have a length which corresponds to that of said mold assembly, which length of said mold assembly is dependent on the use or non-use of said extension means, whereby a longer length for said mold member means and said inner wall means used in conjunction with said extension means provides a longer solidification period for said separating of said cast form surface from said wall cavity.

13. A method for the continuous casting of molten metal into a cast form, employing a casting machine with a mold assembly including at least two different length of mold members having a molten metal receiving end and a cast form discharging end, and with first cooling means having at least two different length inner wall means with different lengths and arranged around said mold member, the steps comprising:



introducing coolant between said inner wall means and said mold member to effect solidification of said molten metal,

connecting an extension means to said first cooling means for increasing the solidification period for said metal,

when using said extension means, replacing a shorter length mold member and a shorter length inner wall means with a longer length mold member and a longer length inner wall means, which longer lengths substantially correspond to the length of said first cooling means with said extension means connected thereto, and

introducing said coolant between said longer length mold member and inner wall means.

4,714,104

METHOD OF CONTINUOUSLY CASTING A METAL AND AN APPARATUS FOR CONTINUOUSLY CASTING THE SAME

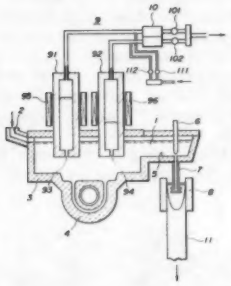
Yutaka Ouchi; Akio Sugino; Kazuo Sugaya, and Kazuo Kimizima, all of Tsuchiura, Japan, assignors to Hitachi Cable, Ltd., Tokyo, Japan

Division of Ser. No. 843,508, Mar. 25, 1986, Pat. No. 4,668,288. This application Mar. 9, 1987, Ser. No. 24,597
Claims priority, application Japan, Mar. 26, 1985, 60-61667
Int. Cl.[4] C21C *7/10*; C22B *9/04, 9/05*
U.S. Cl. 164—504 **5 Claims**

1. An apparatus for continuously casting a metal comprising,

a preserving container for accommodating a continuously supplied molten metal to be poured into a mould, and

vacuum degassing means composed of at least two degassing chambers each being provided with opening dipped into said molten metal of said container for receiving and exhausting said molten metal,



wherein said at least two degassing chambers are operated such that one of said at least two degassing chambers comtains said molten metal while the other of said at least two degassing chambers exhaust said molten metal.

4,714,105

MACHINE FOR CONTINUOUS, MULTISTRAND CASTING IN THE HORIZONTAL

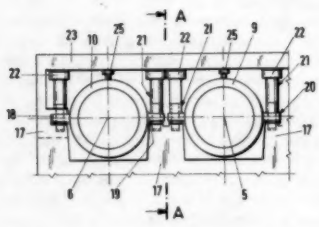
Franz Keutgen, Lissendorf; Achim Kubon, Neukirchen-Vluyn; Dieter Perings, Buedesheim; Peter Stadler, Siegen; Peter Voss-Spilker, Kempen, and Karl-Hermann Apel, Siegen, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 6, 1987, Ser. No. 34,897

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611287

Int. Cl.[4] B22D *11/08*

U.S. Cl. 164—420 **6 Claims**



1. In a machine for continuous casting of multiple casting strands and ingots in the horizontal, which machine includes a distributor and feeding vessel, and a plurality of horizontal casting molds, a structure for placing and positioning as well as orienting the molds in alignment with a respective plurality of continuous casting lines, comprising:

a carriage on which said distributing vessel as well as said molds are mounted in conjunction with respective slide locks, said carriage being movable in relation to said lines of casting including movement along said lines of casting;

a plurality of stationary mounts, having particular invariable positions in relation to said lines of casting; and

locking means for connecting said molds on the carriage, to said mounts whenever said carriage has a particular position in relation to said mounts.

4,714,106

METHOD OF HORIZONTAL CONTINUOUS CASTING

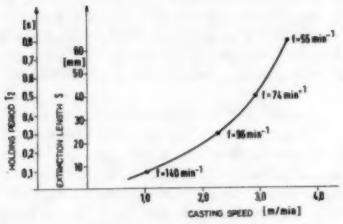
Achim Kubon, Neukirchen, and Peter Voss-Spilker, Kempen, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 27, 1985, Ser. No. 751,545

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1984, 3426168

Int. Cl.[4] B22D *11/128*

U.S. Cl. 164—484 **2 Claims**



1. In a method for continuous casting of metal in particular steel in a horizontal casting mode and under utilization of a cycle being comprised of an extraction stroke, a first holding period, a retraction stroke and another holding period and wherein extraction pulling is carried out at a particular speed and for a particular length and retraction is carried out at a particular speed and for a particular length, the improvement comprising:

maintaining constant the retraction speed, the retraction length and the first holding period between an extraction stroke and a retraction stroke; and

varying extraction speed and extraction length as well as the other holding period between a retraction stroke and the next following extraction stroke.

4,714,107

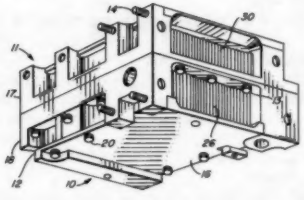
TITANIUM HEAT EXCHANGER FOR LASER COOLING

Anthony P. Adsett, Orlando, Fla., assignor to International Laser Systems, Inc., Orlando, Fla.

Filed Mar. 5, 1981, Ser. No. 240,774

Int. Cl.[4] B28D *7/02*

U.S. Cl. 165—16 A **31 Claims**



12. A heat exchanger apparatus comprising in combination:

a titanium wall liquid passageway having an input and an output, a plurality of titanium walls, at least two of said titanium walls being between 0.020 and 0.040 inches thick and having a plurality of elongated titanium ribs formed thereon, each titanium wall's ribs coacting with the ribs on the other titanium wall by each rib on one wall protruding between pairs of ribs on the other wall; and

a cooling fluid passageway adjacent at least one titanium wall of said titanium walled liquid passageway and having a plurality of metal cooling fins of higher thermal conductivity formed thereon and attached to one said titanium

wall whereby a heat exchanger has a titanium passageway for a liquid to be cooled.

4,714,108

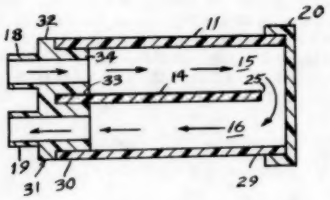
HEAT PUMP SYSTEM

John J. Barry, Erie, Pa., assignor to Pyramid Industries, Inc., Erie, Pa.

Continuation-in-part of Ser. No. 732,963, May 13, 1985, abandoned. This application Aug. 18, 1986, Ser. No. 897,322

Int. Cl.[4] F28D *7/12*

U.S. Cl. 165—45 **1 Claim**



1. An apparatus for using heat from a first subterranean fluid or the like for heating a second fluid comprising:

an elongated pipe generally circular in cross-section having a first end, a second end and a length sufficient to permit said pipe to extend into the earth, into contact with fluid in said earth,

a heat exchanger having a coil therein,

said coil being connected to said pipe,

said pipe having a diametrically disposed partition integrally attached to the inside wall of said pipe and having fillet corners at each side with said partition at the junctures of said partition and said pipe,

said partition extending from said first end to a position closely adjacent said second end, providing a first flow channel and a second flow channel,

a closure closing said second end providing communication between said first flow channel and said second flow channel,

a plug closing said first end,

said plug having a cylindrical body with a first hole and a second hole,

said first hole is spaced from said second hole and extends therethrough and a diametrically extending slot is dispsoed in one side thereof,

said plug being received in said first end of said pipe with an end of said partition received in said slot whereby a flow path is provided from said first hole through said first flow channel through said second flow channel to said second hole,

a first nipple is molded to said plug communicating with said first hole,

a second nipple is molded to said plug overlying said second hole providing connection to said holes,

said pipe being connected to said nipples and to said heat exchanger,

said pipe being disposed in a well containing first fluid for pumping heat from said first fluid to said second fluid,

a pump being connected in series with one said nipple for circulating water through said pipe and through said heat exchanger.

4,714,109

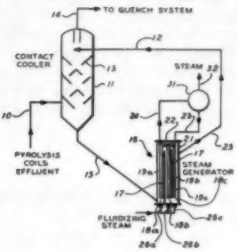
GAS COOLING WITH HEAT RECOVERY

Utah Tsao, 1887 Kennedy Blvd., Jersey City, N.J. 07305

Filed Oct. 3, 1986, Ser. No. 916,011

Int. Cl.[4] F25D *15/00*

U.S. Cl. 165—104.18 **19 Claims**



1. A process for cooling a gas and recovering heat therefrom, comprising:

contacting a hot gas with finely divided solids to cool the gas and heat the solids; separating the gas and heated solids; passing heated solids through at least two zones; maintaining the solids as a fluidized bed in said at least two zones; and recovering heat from the heated solids in the at least two zones by heat exchange with a heat transfer fluid.

4,714,110

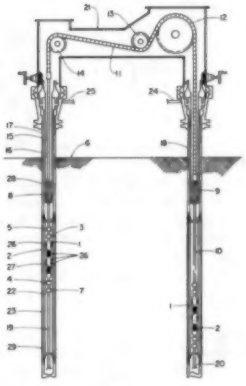
DEVICE TO RELIEVE SUCKER ROD TORQUE BELOW GROUND LEVEL IN A PETROLEUM WELL

Edward D. Dysarz, 11423 Triola La., Houston, Tex. 77072

Continuation-in-part of Ser. No. 668,515, Nov. 4, 1984, Pat. No. 4,676,311. This application Aug. 7, 1986, Ser. No. 893,991

Int. Cl.[4] E21B *17/10*; **F16D** *1/12*

U.S. Cl. 166—68 **4 Claims**



1. An apparatus for use in a sucker rod string having a polished rod for relieving torque below said polished rod and inside of a well while said sucker rod string is moving up and down inside of said well, comprising:

a body, said body that is suitably fastened to the lower end of said polished rod;

at least one set of rollers that are suitably mounted within said body by axles, said rollers with a diameter greater than the width of said body;

a lower swivel, said lower swivel that is suitably fastened to the lower end of said body at the top of said lower swivel, said lower swivel is further suitably attached at the lower

end of said body to the upper end of said sucker rod string, said lower swivel to isolate said sucker rod string from said body by allowing said sucker rod string to rotate freely without causing said body to rotate;

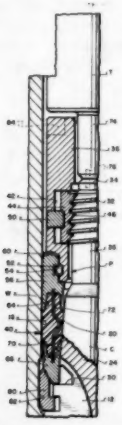
a guide, said guide being a tube that is square in section and is set vertically within said well, said guide is suitably fastened to said well at top and bottom of said guide, said guide to have an inside dimension that is slightly greater than the diameter of said rollers to allow said rollers to roll on the inside of said guide, said guide to restrain said rollers set and held within said body, allowing said body and rollers to move freely up and down within said guide while restraining said body and said rollers from rotating horizontally.

4,714,111

WEIGHT/PRESSURE SET PACK-OFF FOR SUBSEA WELLHEAD SYSTEMS

Norman Brammer, Ventura, Calif., assignor to Vetco Gray Inc., Houston, Tex.

Filed Jul. 31, 1986, Ser. No. 891,704
Int. Cl.[4] E21B *33/04*
U.S. Cl. 166—182 **11 Claims**



1. In combination:

a vertical outer body member having an internal cylindrical sealing surface;

a vertical inner body member within said outer body member and having an external conical sealing surface;

said inner body member being radially spaced from said outer body member to define a tapered annulus between said sealing surfaces;

one of said body members having an abutment;

conically tapered multi-start threads on said inner body member,

a tapered pack-off assembly including supporting means movable longitudinally toward said abutment;

said tapered pack-off assembly carried by said supporting means which when energized will sealingly engage said sealing surfaces of said annulus,

said supporting means having a split ring capable of expanding and contracting radially,

said split ring having conically tapered multi-start threads on its inner wall capable of mating with said multi-start threads on said inner body member,

a running tool adapted for connection to a running string,

means releasably connecting said supporting means to said running tool and positioning said pack-off assembly above said annulus,

said running tool having means for engaging the top of said inner body member and which when engagement occurs said multi-start threads are partially overlapping and partially threaded and said tapered pack-off is partially within said tapered annulus but in unenergized condition,

said partial overlapping and threading being a function of the weight of said running string and said split ring, and

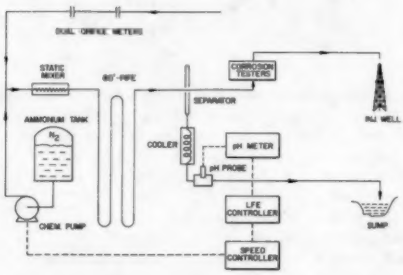
means for moving said pack-off assembly longitudinally toward said abutment to engage said abutment and expand said pack-off into an energized condition in sealing engagement with said sealing surfaces of said annulus.

4,714,112

METHOD FOR CONTROLLING ROCK DISSOLUTION AND PIPE CORROSION DURING OIL WELL STEAM INJECTION

Andrew Nigrini, La Habra Heights, and Liming Hsueh, Buena Park, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 848,662, Apr. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 728,063, Apr. 29, 1985, and a continuation-in-part of Ser. No. 654,331, Sep. 24, 1984, abandoned. This application Jun. 22, 1987, Ser. No. 65,198
Int. Cl.[4] E21B *43/22, 47/00, 47/06*
U.S. Cl. 166—252 **38 Claims**



18. A method for inhibiting silica dissolution while preventing pipe corrosion for use in the vicinity of a well penetrating a hydrocarbon-containing formation, comprising:

(a) injecting steam into said well, said steam having a liquid phase and a vapor phase, and including an effective amount of a salt to reduce the pH of said liquid phase of said steam to a range of about 8.0 to about 10.0 said salt comprising a volatile cationic component and a nonvolatile anionic component; and

(b) monitoring the pH of said liquid phase of said steam and continually adjusting the addition of said salt to maintain the pH of said liquid phase of said steam within the range of from about 8.0 to about 10.0.

29. A method for recovering hydrocarbons from a silicate or carbonate containing hydrocarbon-bearing formation penetrated by at least one well, wherein said method inhibits formation dissolution while preventing pipe corrosion, said method comprising the steps of:

(a) injecting steam into said well, said steam produced from a water having added thereto an effective amount of a salt to reduce the pH of the residual liquid phase of said steam to within the range of from about 8.0 to about 10.0, said salt comprising a volatile cationic component and a nonvolatile anionic component;

(b) monitoring the pH of said residual liquid phase of said steam and continually adjusting the addition of said salt to maintain the pH of said liquid phase within the range of from about 8.0 to about 10.0;

(c) producing said hydrocarbons.

4,714,113
ALKALINE WATER FLOODING WITH A PRECIPITATION INHIBITOR FOR ENHANCED OIL RECOVERY

Shantilal M. Mohnot, Copley, Ohio, and Paritosh M. Chakrabarti, Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 5, 1986, Ser. No. 938,496
Int. Cl.[4] E21B *43/22*
U.S. Cl. 166—270 **18 Claims**

1. A process for the enhanced recovery of oil from a subterranean reservoir penetrated by at least one injection well and at least one production well wherein the reservoir includes an aqueous phase containing dissolved divalent metal c.tions, the process comprising injecting through an injection well an aqueous solution including an alkaline material sufficient to provide a solution pH of above about 8 and a predetermined amount of water-soluble precipitation inhibitor selected from the group consisting of polyacrylates and acrylate-containing copolymers having a number average molecular weight of from about 500 to about 50,000, polymaleic anhydrides, organo-phosphonates or carboxylate-containing organo-phosphonates selected from the group consisting of aminotrimethylenephosphonic acid, hydroxyethanediphosphonic acid, ethylenediaminetetramethylenephosphonic acid, diethylenetriaminepentamethylenephosphonic acid, hexamethylenediaminetetramethylenephosphonic acid, phosphinopolycarboxylic acid, phosphenobutane tricarboxylic acid and alkali metal or ammonium salts thereof, said predetermined amount being sufficient to prevent substantial precipitation of divalent metal hydroxides or divalent metal carbonates in the injection well or the immediate vicinity of the injection well.

4,714,114
USE OF A PROPPANT WITH CONTROLLED PULSE FRACTURING

Lloyd G. Jones, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 22, 1986, Ser. No. 944,739
Int. Cl.[4] E21B *43/267*
U.S. Cl. 166—280 **15 Claims**

1. A method for treating fractures resultant from controlled pulse fracturing comprising:

(a) placing a high energy impulse device containing a propellant into a wellbore contained in a subterranean formation near said formation's productive interval;

(b) injecting into said wellbore a proppant, of a size sufficient to prop said fractures, suspended in a liquid which liquid covers said productive interval; and

(c) igniting said propellant in said high energy impulse device which generates fracturing pressure and maintains a peak pressure load sufficiently above the in-situ stress pressure but below the rock yield stress for a time sufficient to create more than two simultaneous multiple radial fractures to allow fluid penetration, proppant entry into resultant fractures, and extension of said fractures.

4,714,115
HYDRAULIC FRACTURING OF A SHALLOW SUBSURFACE FORMATION

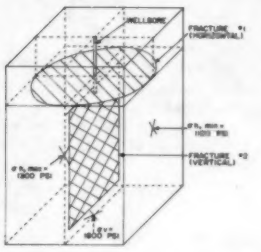
Duane C. Uhri, Grand Prairie, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 8, 1986, Ser. No. 938,892
Int. Cl.[4] E21B *43/26*
U.S. Cl. 166—308 **11 Claims**

1. A method for propagating a vertical hydraulic fracture in an earth formation surrounding a borehole where the original in-situ stresses favor a horizontal fracture, comprising the steps of:

(a) firstly supplying fracturing fluid to said formation at a first depth within said borehole to propagate a horizontal fracture favored by the original in-situ stresses of the formation, and

(b) secondly supplying fracturing fluid to said formation at a

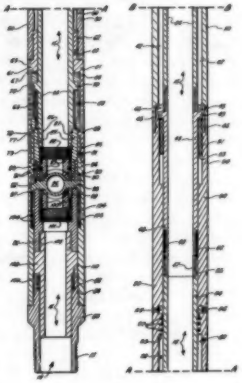


second depth within said borehole, while maintaining pressure in said horizontal fracture, to propagate a vertical fracture as favored by the in-situ stresses as altered by the propagating of said horizontal fracture.

4,714,116
DOWNHOLE SAFETY VALVE OPERABLE BY DIFFERENTIAL PRESSURE

Travis J. Brunner, P.O. Box 802, Houma, La. 70361-0802

Filed Sep. 11, 1986, Ser. No. 906,165
Int. Cl.[4] E21B *34/06*
U.S. Cl. 166—321 **10 Claims**



1. an oil well downhole safety valve operable by downhole annulus pressure, comprising

a. a tool body having a continuous [well]wall defining a longitudinal flow bore for conveying liquid, and adapted to travel through a well annulus as part of a work string;

b. a valve body slideably mounted within the tool longitudinal flow bore;

c. seal means carried by the valve body for forming a seal between the valve body and the continuous wall of the tool body;

d. a valving member carried by the valve body for travel therewith and movable between open flow and closed flow positions for valving the flow bore;

e. drive means operative by annulus pressure for moving the valving member between open flow and closed flow positions and comprising a pair of opposing pistons attached to the valve body with drive surfaces of differing surface areas; and

f. a pair of openings through the tool body and positioned respectively above and below the pair of pistons, for

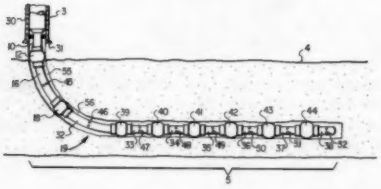
allowing annulus pressure to communicate with the flow bore and with the piston dirve surfaces so that annulus pressure simultaneously acting upon the piston drive surfaces can move the valving member.

4,714,117

DRAINHOLE WELL COMPLETION

James A. Dech, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 20, 1987, Ser. No. 40,419
Int. Cl.[4] E21B *33/124, 33/13*
U.S. Cl. 166—380 **4 Claims**



1. In a method for completing a curved drainhole wellbore defined by a wall formed by drilling into at least one subsurface geologic formation, the improvement comprising inserting into said drainhole wellbore a casing string composed of alternating casing subs and external casing packer subs, each of said casing subs being solid and not perforated when said casing string is inserted into said wellbore, each of said external casing packer subs carrying an elastic member adapted to expand away from said casing packer sub toward and into contact with the adjacent wall of said drainhole wellbore, whereby, except for the end most casing sub, each said closing sub carries first and second external casing packer subs on either end thereof so that upon expansion of said elastic members carried by said first and second external casing packer subs the intermediate casing sub is isolated in the annulus outside said casing string assembly and inside said drainhole wellbore, and activating said external casing packer subs by pumping an activating fluid into said casing string to expand essentially all elastic members on said casing string at essentially the same time by expanding the elastic member into contact with said drainhole wellbore wall thereby to form isolated zones along said casing string, said isolated zones extending from outside said casing string to said drainhole wellbore wall, and thereafter perforating at least one of said solid casing subs to establish fluid flow contact between the interior of said casing string and said geologic formation.

4,714,118

TECHNIQUE FOR STEERING AND MONITORING THE ORIENTATION OF A POWERED UNDERGROUND BORING DEVICE

Glen Baker, Kent; Albert W. Chau, Redmond, and John E. Mercer, Kent, all of Wash., assignors to FlowMole Corporation, Kent, Wash.

Filed May 22, 1986, Ser. No. 866,241
Int. Cl.[4] E21B *7/08, 44/00*
U.S. Cl. 175—26 **27 Claims**

1. An apparatus for providing a continuous underground tunnel, comprising:

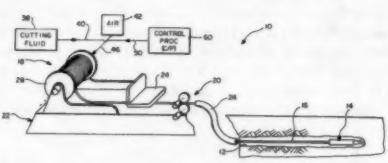
(a) an elongated boring device having a central elongation axis and an axially extending main body, a forward boring head coaxially positioned with and rotatably mounted to said main body, and a nozzle on said boring head in a forward facing position off axis with respect to said device;

(b) means for supplying fluid under pressure to said nozzle whereby to produce a pressurized fluid jet at the output of said nozzle in a direction forward of and off axis with respect to said device, said jet being sufficiently strong to bore through soil;

(c) means for urging the boring devcie forward as said jet is being produced whereby to cause the device to move forward into the area being bored out by said jet; and

(d) means for moving said boring head and nozzle about the axis of the device in a first way for causing the device to move forward along a straight path and in a second way for causing the device to move forward along a particular curved path that depends upon the way in which the boring head is rotated, said means for moving said boring head including means for rotating said boring head in said one way at a constant speed around the axis of said boring device so as to cause the boring device to move along a straight path and means for moving said boring head in said second way about the axis of said boring device such that said fluid jet spends more time along a particular segment of its path about said axis than on the rest of its path of movement so that the particular segment of said path determines the particular curved path taken by the boring device.

11. In an apparatus for providing an underground tunnel by means of an elongated boring device which is caused to move through the soil underground, the improvement comprising



means for monitoring the pitch angle defined by the elongation axis of said boring device relative to a horizontal ground plane, independent of the roll position of the device, said monitoring means including a sensor carried by said device for producing signals corresponding to the pitch of the device independent of its roll position and means for detecting and processing said signals, said sensor including

(a) a closed, hollow tubular container having its axis positioned parallel with the elongation axis of said boring device and defining a co-axially extending internal chamber having opposite ends,

(b) electrical circuit means including first and second contact means located within and at the opposite ends of said chamber and a third contact means located within and extending around said chamber at a point intermediate its opposite ends,

(c) an electrolytic solution partially filling said chamber so as to make contact with all three of said contact means, the extent of contact being made by the solution with said first and second contact means depending on the pitch angle of said boring device but independent of its roll position and said signals depending upon the extent of contact being made by the solution with said first and second contact means.

4,714,119

APPARATUS FOR HARD ROCK SIDEWALL CORING A BOREHOLE

Joel J. Hebert, Houston, and Jo-Yu Chuang, Sugar Land, both of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Oct. 25, 1985, Ser. No. 791,246
Int. Cl.[4] E21B *25/02, 49/06*
U.S. Cl. 175—20 **12 Claims**

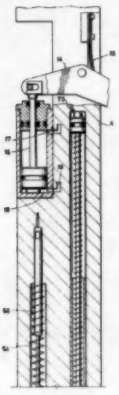
1. A device for cutting a core from the sidewall of a borehole comprising:

an elongated housing lowerable into the borehole;

means for anchoring said housing at a desired position in the borehole;

at least one guide plate fixedly mounted inside said housing in a generally vertical position, said guide plate having therein a J-shaped slot with an elongate leg thereof disposed in a generally horizontal position and a shorter leg extending upward therefrom; core drilling means;

first and second pins extending from the side of said drilling means into said J-shaped slot of said at least one guide



plate, and arranged in a line parallel to an axis of said drilling means; and

drive means for driving said first pin along said J-shaped slot for pivoting said drilling means between a substantially vertical position and a substantially horizontal position, said drive means including a drive plate pivotally mounted to said housing, means for coupling said drilling means to said drive plate for pivotal movement therewith and means for pivotally moving said drive plate to drive said first pin along said J-shaped slot.

4,714,120

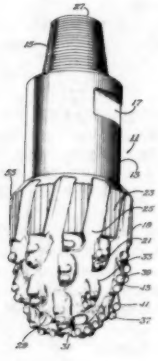
DIAMOND DRILL BIT WITH CO-JOINED CUTTERS

William W. King, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Continuation of Ser. No. 823,706, Jan. 29, 1986, abandoned. This application Apr. 23, 1987, Ser. No. 42,546

Int. Cl.[4] E21B *10/46*

U.S. Cl. 175—329 **2 Claims**



1. An earth boring bit, comprising:

a body including a metallic shank on one end with a tubular bore and with means for connection to a drill string member and rotation about a longitudinal axis;

a cast matrix bonded to the metallic shank and forming a face of the bit, the bit face having a plurality of cutting elements mounted within backings of the matrix and extending radially on the bit face from a central location to an outermost gage portion, the cutting elements having cutting surfaces for dislodging geological formations;

at least one fluid opening communicating the bit face with the tubular bore of the bit for circulating fluids to the bit face; and

wherein the cutting elements are arranged in groupings, the groupings including a plurality of cutter blades comprised of at least four cutters joined by a common backing, the cutter blades being mounted on the bit face adjacent the fluid opening and extending radially on the bit face from the central location in the directon of the gage portion but terminating short of the gage portion, the groupings on the bit face also being provided as pairs of cutters which are co-joined by a common backing of the matrix, the co-joined pairs being spaced-apart radially and circumferentially from adjacent co-joined pairs and from the cutter blades, the bit groupings on the bit face further being characterized in that none of the groupings extend from the central location completely to the outermost gage portion, so that fluid circulated through the fluid opening to the face of the bit can pass through the spaces defined between the groupings of cutters in an unchanneled fashion.

4,714,121

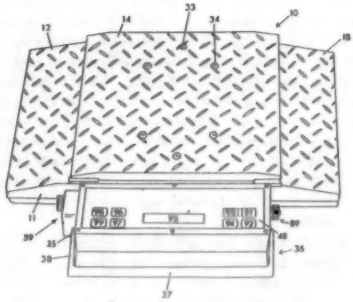
WHEEL SCALE ASSEMBLY

William P. Kroll, 2382 Pioneer Trail, Medina, Minn. 55340; Robert E. K. Kroll, 300 Shelard Pkwy., St. Louis Park, Minn. 55426; Mark W. Kroll, 13011 Brenwood Trail, Minnetonka, Minn. 55343, and Karl J. F. Kroll, 5217 W. Mill Rd., Minnetonka, Minn. 55345

Filed Feb. 3, 1987, Ser. No. 10,324

Int. Cl.[4] G01G *19/02, 23/14, 21/24*

U.S. Cl. 177—134 **20 Claims**



1. A portable electronic wheel scale comprising:

a. a thin, lightweight housing structure having opposing ramp ends and an interiorly disposed opening having a bottom surface,

b. opposing bearing surfaces fixed to said bottom surface,

c. at least one load cell having at least one strain gauge in communication therewith, said load cell having a rectilinear body structure and having opposing bearing means extending downward at its ends for engaging said bearing surfaces,

d. a load cell retaining structure fixed to said housing structure, said retaining structure having opposing vertically movable and lateral movement restricting elongated flexible members, and

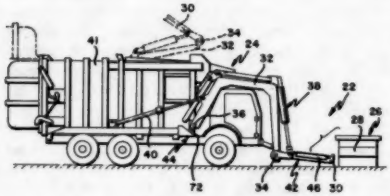
e. a platform member fastened to said load cell and to said vertically movable flexible and lateral movement restricting members of said load cell retaining structure.

4,714,122

WEIGHING SYSTEM FOR REFUSE TRUCKS

Gregory H. Appleton, Gardner, and Paul D. Mikelk, Berlin, both of Mass., assignors to Breakthru Industries, Inc., Clinton, Mass.

Filed Oct. 20, 1986, Ser. No. 922,064
Int. Cl.[4] G01G *19/08, 19/12*
U.S. Cl. 177—139 **10 Claims**



1. Weighing system for a refuse truck having a refuse receptacle which has top opening and lifting means for engaging and lifting a refuse container which has a top opening from a resting position outside of the truck to an inverted position above the opening of the refuse receptacle to permit the contents of the refuse container to fall into the refuse receptacle, said refuse truck being a front end loader which has a pair of forwardly-extending support arms for engaging complementary support fixtures of a refuse container and a lifting boom for lifting the support arms and a refuse container which is supported on said support arms from a position in front of the truck to a position above the top opening of the refuse receptacle, said weighing system comprising:

(a) a transducer which is mounted on the lifting means of said refuse truck for sensing the weight of a refuse container when the container is supported by the lifting means, said transducer being effective for generating an electrical analog signal which is proportional to the weight which is sensed by the transducer, said transducer comprising a transducer fixture which is mounted on each support arm, said transducer fixture comprising:

(1) a housing which is fixed to the support arm,

(2) a pressure load cell which is supported on said housing, said load cell having a main body and an upwardly-extending sensing element which is mounted on said main body for vertical movement relative to said main body, and

(3) a pressure plate which is supported on the sensing element of said pressure load cell and which is guided by said housing for vertical movement relative to said housing, said pressure plate having an upper surface for supporting the refuse container,

(b) electrical digitizing means for converting said analog signal to a digital signal which is indicative of the weight which is sensed by the transducer,

(c) a source of electrical power, and

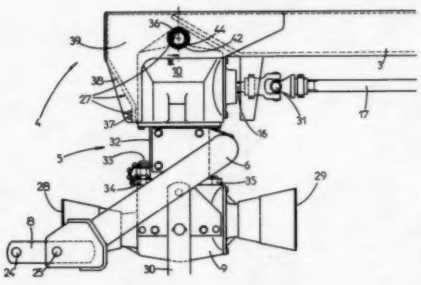
(d) switch means including a normally open limit switch which is operatively connected between said transducer and said source of electrical power so that said transducer is energized only when said switch is closed, said limit switch being mounted on said refuse truck so that the switch is closed as a result of the action of said lifting means at a point during the lifting of a full refuse container and the lowering of an empty refuse container when the container is fully supported by said lifting means.

4,714,123

FARM MACHINE WITH IMPROVED TRANSMISSION DEVICE

Rino Ermacora, and Thierry Krebs, both of Saverne, France, assignors to Kuhn, S.A., Saverne, France

Filed Mar. 27, 1986, Ser. No. 844,562
Claims priority, application France, Mar. 28, 1985, 85 04897
Int. Cl.[4] B60K *25/06;* A01B *71/06*
U.S. Cl. 180—14.4 **9 Claims**



1. A farm machine to be pulled by a tractor, said farm machine comprising:

(a) working elements;

(b) a body arranged to support said working elements;

(c) a beam unit arranged for connecting said body to a tractor during use, said beam unit comprising:

(i) a tongue having a front part, a rear part, and a longitudinal axis, said tongue being fastened at its rear part to said body;

(ii) a transmission housing comprising an upper part and a lower part rotatable relative to said upper part about an at least approximately vertical axis; and

(iii) a hitching member fastened to said lower part of said transmission housing and adapted to be connected to the tractor during use;

(d) transmission output drive means arranged to transmit rotary movement from said transmission housing to said working elements, said rotary movement being received by said working elements; and

(e) fastening means for fastening said upper part of said transmission housing to said tongue, said fastening means comprising:

(i) a connecting pin which extends transversely entirely through said upper part of said transmission housing, said connecting pin being axially secured by first securing means, and

(ii) second securing means for blocking rotation of said transmission housing around said connecting pin.

4,714,124

GUIDANCE SYSTEM FOR SELF-GUIDED VEHICLE

Donald L. Laib, Forest Grove, Oreg., assignor to Forest Grove Industries, Inc., Forest Grove, Oreg.

Filed Jun. 9, 1986, Ser. No. 872,034
Int. Cl.[4] B62D *1/24*
U.S. Cl. 180—168 **35 Claims**

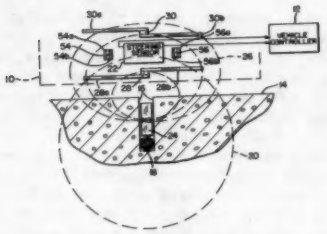
1. In combination with a self-guided vehicle of the type which is guided along a predetermined path defined by an operative portion of a magnetic field of an elongate current-carrying conductor mounted separate from said vehicle, an apparatus for providing information to said vehicle comprising:

(a) a permanent magnet;

(b) magnetic sensor means on said vehicle for sensing the magnetic field of said permanent magnet;

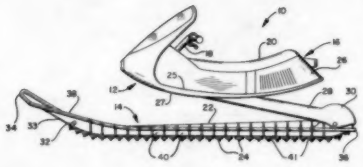
(c) said permanent magnet being positioned adjacent to said

current-carrying conductor within said operative portion of the magnetic field of said conductor in a predetermined location along said conductor and having a magnetic



permeability substantially no greater than that of free space so as to substantially prevent distortion by said magnet of said operative portion of the magnetic field of said conductor.

4,714,125
SINGLE LATERALLY BENDABLE TRACK SNOWMOBILE
Jack C. Stacy, Jr., Rte. 3, Box 107A, Santa Fe, N. Mex. 87501
Filed May 5, 1986, Ser. No. 859,381
Int. Cl.[4] B62D *11/22*
U.S. Cl. 180—182 **19 Claims**



1. A single track vehicle having a main body, a track assembly spaced from and underlying said main body, a suspension arm by which the main body is supported in spaced relationship respective to the track assembly;

said track assembly includes an endless, flexible track means and a track support means; means capturing said track means in an oblated form respective to said track support means for ground supporting the vehicle from the track means;

means by which one of the suspension arm is connected to the track support means; and,

the other end of the suspension arm is connected to said main body so that the suspension arm provides the only support for the main body.

4,714,126
FOUR-WHEEL DRIVE VEHICLE
Takashi Shinozaki, and Takeshi Kawaguchi, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 836,228, Feb. 28, 1986, abandoned.
This application Mar. 2, 1987, Ser. No. 21,556
Claims priority, application Japan, Dec. 28, 1982, 57-232860
Int. Cl.[4] B60K *17/34*
U.S. Cl. 180—233 **6 Claims**

1. A four-wheel drive vehicle of the type wherein the rider straddles the vehicle, comprising:

a frame supportive of said rider and containing structural members arranged for mounting an engine and drive elements therefrom;

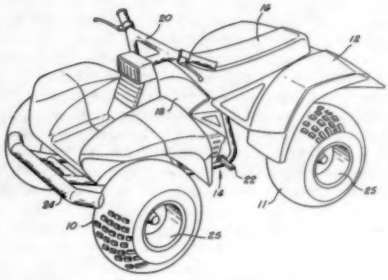
rotatable drive shafts driven by said drive elements disposed forwardly and rearwardly, respectively, of said frame;

each of said drive shafts connecting wheels at their opposite ends, said wheels being disposed laterally outwardly of said frame;

front and rear swing arms each having one end pivotally connected to said frame and their free ends mounting each of the respective drive shafts for rotation;

front and rear cushion members operatively connected between said swing arms and said frame;

a head tube on the forward end of said frame;



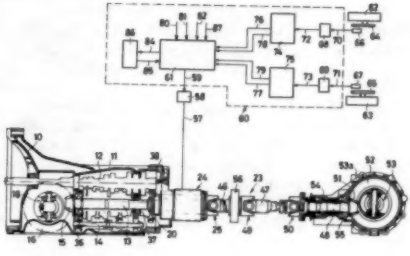
a steering mechanism operatively supported by said head tube;

said front swing arm comprising an integrated assemblage of structural members including opposed sides diverging outwardly from the pivoted end of said swing arm and terminating closely adjacent the forwardly disposed wheels of said vehicle;

steering hubs rotatably mounting each of said front wheels, said steering hubs being pivotally attached to the opposed sides of the free end of said front swing arm; and

said steering mechanism operatively connecting each of said steering hubs.

4,714,127
CONTROL APPARATUS FOR A VEHICLE WITH DISENGAGEABLE FOUR-WHEEL DRIVE
Cristoforo Fanti, Milan; Gianclaudio Travaglio, Arese; Luciano Ferrario, Rho, and Saverio Moscatelli, Milan, all of Italy, assignors to Alfa Romeo Auto S.p.A., Naples, Italy
Filed Aug. 4, 1986, Ser. No. 892,361
Claims priority, application Italy, Aug. 6, 1985, 21871 A/85
Int. Cl.[4] B60K *23/08, 17/34*
U.S. Cl. 180—233 **4 Claims**



1. A control apparatus particularly for a four-wheel drive vehicle in which one wheel group is always engaged, the output shaft of the change-speed gearbox being connected permanently to the differential of said one wheel group and being connected selectively to the differential of the other

wheel group by separable connection means and actuator means, said control apparatus comprising means which sense the respective speed of the wheels of the always engaged group and are operationally connected to a control unit comprising comparator means arranged to compare the wheel speed signals with predetermined limiting values to establish whether they are greater or less than said limiting values and to provide signals indicative of the results of the comparison, said control unit being operationally connected to said actuator means, characterised by also comprising means for sensing the position of the brake pedal and means for sensing the commencement of travel of the accelerator pedal and also operationally connected to said control unit, said control unit comprising logical operation means in cooperation with said comparator means and responsive to said signals is able to feed to said actuator means first signals for causing said connection means to disconnect the differential of said other wheel group from the output shaft of the gearbox should the speed be less than the predetermined limit, and second signals for causing said connection means to connect said differential of said other wheel group with the output shaft of the gearbox should the speed exceed the predetermined limit, said control unit further comprising processor means arranged to obtain from the signals of said wheel speed sensors signals indicative of the speed variations and the direction of said variations in order to distinguish acceleration from deceleration, said comparator means being also able, in the presence of a signal indicating that the travel of the accelerator pedal has commenced, to compare the acceleration signals with a predetermined limiting value to establish whether these are greater or less than said limiting value, and to provide signals indicative of the results of the comparison, said logical operation means being also able to exclude said first signals and able to feed to said actuator means said second control signals for causing said connection means to make said differential rigid with the output shaft of the gearbox should the acceleration exceed the predetermined limit, said comparator means being further able, in the presence of a signal indicating operation of the brake pedal, to compare the deceleration signals with a predetermined limiting value to establish whether they are greater or less than said limiting value and to provide signals indicative of the results of the comparison, said logical operation means being able to exclude said second signals and being able to feed said first signals to said actuator means in order to cause said connection means to disconnect the differential of said other wheel group from the output shaft of the gearbox, even at a speed exceeding said limiting value, should the deceleration be greater than the respective limiting value.

4,714,128

STOP MEMBER MECHANISM FOR USE IN A FOUR-WHEEL DRIVE VEHICLE

Toshio Yoshinaka, Nagoya, and Shuji Nagano, Toyota, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Oct. 24, 1986, Ser. No. 922,695

Claims priority, application Japan, Oct. 24, 1985, 60-163254[U]

Int. Cl.[4] G05G *5/10*; F16B *21/00*

U.S. Cl. 180—247 **6 Claims**

1. A four-wheel drive system for use in a vehicle including a first and a second pair of road wheels, an engine including an output shaft, and a transmission including input and output shafts, the input shaft of the transmission being selectively connected to the output shaft of the engine, the output shaft of the transimssion selectively being in driving engagement with the input shaft of the transmission, the four-wheel drive system comprising:

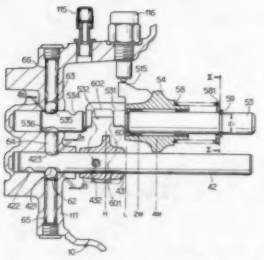
a first spline member which is rotatable about a first rotational axis, said first spline member being driven by the output shfat of the transmission;

a second spline member which is rotatable about the first rotational axis of said first spline member, said second spline member being located adjacent to said first spline member, said second spline member including a first engagement means and a first disengagement preventing means;

an engagement sleeve member being slidably mounted on said first spline member, said engagement sleeve member including a second engagement means and a second disengagement preventing means, the second engagement means of said engagement sleeve member selectively engaging with the first engagement means of said second spline member, the second disengagement preventing means of the engagement sleeve member selectively engaging with the first disengagement preventing means of the second spline member, said engagement sleeve member being selectively positioned at one of an engagement position and a disengagement position;

a shaft member being located parallel to the first rotational axis of said first spline member, said shaft member being selectively positioned at one of a first position and a second position, the first position of said shaft member corresponding to the engagement position of said engagement sleeve member, the second position of said shaft member corresponding to the disengagement position of said engagement sleeve member, said shaft member including a projection, a first notch and a second notch, a width of the first notch being larger than a width of the second notch;

a locking member being biased toward said shaft member, said locking member being selectively inserted in one of the first and second notches of said shaft member, such that when the shaft member is positioned at the first position, the locking member is inserted into the first notch of said shaft member and a first space is defined in the longitudinal direction of said shaft member between a side of the locking member and a corresponding side of the first notch, and when the shaft member is positioned at the second position, the locking member is inserted into the second notch of said shaft member and two sides of the locking member are in contact with corresponding sides of the second notch;



a fork member being slidably mounted on said shaft member, said fork member including an engagement finger, the engagement finger engaging with said engagement sleeve member, the fork member being selectively positioned at one of a third position and a fourth position, the third position of the fork member corresponding to the first position of the shaft member, and the fourth position of the fork member corresponding to the second position of the shaft member;

a biasing means which forces the fork member to move toward the projection of the shaft member; and

a stop member being secured to the shaft member, the stop member being located adjacent to the bising means, the stop member including a tentative holding portion and a firmly gripping portion, such that when the stop member contacts the shaft member at the tentative holding portion thereof, such contact is temporary and the stop member can be easily removed from the shaft member to adjust spatial relationships between the engagement sleeve member, the fork member and the shaft member, and when the

stop member contacts the shaft member at the firmly gripping portion thereof, the stop member is firmly secured to the shaft member to prevent the engagement sleeve member, the fork member and the shaft member from changing spatial relationships therebetween.

4,714,129

TRANSMISSION SYSTEM WITH INTERMEDIATE DIFFERENTIAL FOR ALL-WHEEL DRIVE VEHICLE

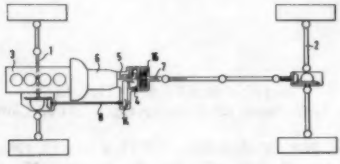
Robert Mueller, Moensheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany

Filed Mar. 3, 1986, Ser. No. 835,647

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1985, 3507492

Int. Cl.⁴ B60K *17/346, 17/348*

U.S. Cl. 180—248 **3 Claims**



1. All wheel drive arrangement for a motor vehicle having an intermediate differential arranged between a front and a rear axle, said arrangement comprising:

transfer means for transferring a first range of rotational moments to the front axle from said rear axle as a function of a rotational speed difference between said front and rear axles when said front axle is rotating faster than said rear axle, and transferring a second range of rotational moments different from said first range of rotational moments to the rear axle from said front axle as a function of said rotation speed difference between said front and rear axles when said rear axle is rotating faster than said front axle;

wherein said transfer means include plate clutch means comprising:

clutch housing means;

outer clutch plate means rotationally fixed to said clutch housing means;

clutch hub means rotationally fixedly connected to a driven shaft means; and

inner clutch plate means, said inner clutch plate means being drivingly engageable with said driven shaft means by said clutch hub means;

wherein said inner clutch plate means includes a first portion of said inner clutch plate means, wherein said first portion is drivingly engageable with said outer clutch plate means when said front axle is rotating faster than said rear axle, and a second portion of said inner clutch plate means which is drivingly engageable with said outer clutch plate means when said rear axle is rotating faster than said front axle;

further including a one way clutch means disposed between said second portion and said clutch hub means, for decoupling said second portion from said outer clutch plate means when said front axle is rotating faster than said rear axle.

4,714,130

AXLE REDUCTION APPARATUS FOR TRACTOR

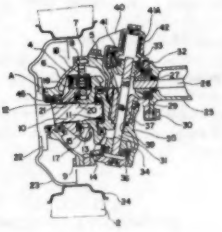
Tsugunobu Ujita, and Seiichi Takahashi, both of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan

Continuation of Ser. No. 842,051, Feb. 14, 1986, abandoned, which is a continuation of Ser. No. 586,499, Mar. 5, 1984, abandoned. This application Mar. 26, 1987, Ser. No. 31,201

Claims priority, application Japan, Jul. 28, 1983, 58-138977

Int. Cl.⁴ B60K *17/30*

U.S. Cl. 180—262 **7 Claims**



1. An axle reduction apparatus for a tractor comprising:

an axle reduction casing **(4)** which supports a ring gear **(7)** and includes first **(6)** and second **(5)** casing members detachably attached to each other with said ring gear secured therebetween;

an axle **(10)** having inner and outer end portions disposed centrally of said axle reduction casing;

first bearing means **(12)** supported in said first casing member for receiving said outer end portion of said axle;

second bearing means **(11)** supported in said second casing member for receiving said inner end portion of said axle;

an integrated gear **(13)** fitted on an outer surface of said axle for relative rotation with respect thereto, said integrated gear including an input gear **(14)** and a sun gear **(15)** formed integrally relative to each other;

a carrier member **(17)** fixedly secured on the outer surface of said axle outwardly adjacent to said sun gear, said carrier carrying planet gears **(18)** in mesh with said sun and ring gears, respectively;

third bearing means **(21)** supported on said carrier member between said carrier member and said integrated gear; and

fourth bearing means **(16)** supported outwardly of said second bearing means, said integrated gear being supported on said fourth bearing means.

4,714,131

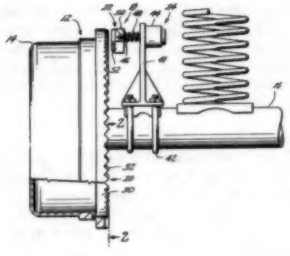
WAFFLE SAFETY DEVICE

Lester R. Wisegerber, 38 Brown La., Dayton, Tex. 77535

Filed Apr. 17, 1986, Ser. No. 853,192

Int. Cl.⁴ B60R *25/10*

U.S. Cl. 180—287 **15 Claims**



1. A vehicle movement warning and movement deterrence

device adapted for coupling adjacent a vehicle wheel assembly, comprising:

a first waffle surface having a plurality of undulations and operatively coupleable to the wheel assembly for rotation in a path of travel with the wheel assembly;

a second waffle surface having a plurality of undulations complementally dimensioned for meshing engagement with the undulations of the first waffle surface; and

shift means coupled to said second waffle surface for mounting the second waffle surface to the vehicle adjacent said path of travel and for selective shifting of said second waffle surface into operative meshing engagement with the first waffle surface,

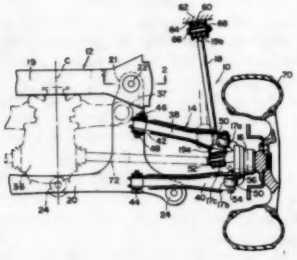
said undulations being configured and said shift means operable with the waffle surfaces in meshing engagement to impede movement of the first waffle surface relative to the second waffle surface and to create an audible clatter when the first waffle surface moves relative to the second waffle surface and the respective undulations slip past each other.

4,714,132

SUSPENSION OF VEHICLE

Tetsuo Hattori, and Shoichi Seko, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Nov. 5, 1986, Ser. No. 927,097
Claims priority, application Japan, Nov. 5, 1985, 60-246327
Int. Cl.[4] B60D *21/00*
U.S. Cl. 180—312 **11 Claims**



1. A suspension of a vehicle having a differential, said suspension comprising:

a subframe formed as a unit having a plurality of elastic insulators, four of said insulators being disposed at the front leftward and rightward portion and a rear leftward and rightward portion, said subframe being coupled to a car body through said plurality of insulators, said differential being mounted on said subframe;

at least one suspension arm disposed on each side of the subframe between the front and rear insulators and coupled at an inner end thereof with the subframe so as to be pivotable in a vertical direction;

a wheel carrier pivotably coupled with an outer end of the suspension arm in the vertical direction; and

a strut bar disposed longitudinally of the car body and coupled at one end thereof with either said wheel carrier and suspension arm and at the other end with the car body respectively pivotably in the vertical direction.

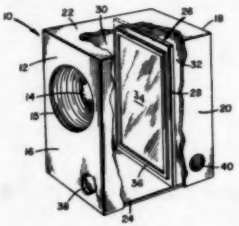
4,714,133

METHOD AND APPARATUS FOR AUGMENTATION OF SOUND BY ENHANCED RESONANCE

John E. Skaggs, Jr., 320 N. Poppy, Lompoc, Calif. 93436

Filed Jun. 14, 1985, Ser. No. 744,537
Int. Cl.[4] G10K *13/00*; H05K *5/00*
U.S. Cl. 181—160 **20 Claims**

1. In a loudspeaker enclosure formed of a front wall and an imperforate rear wall with side walls joining said front and rear walls and having at least one driver mounted in the front wall, the improvement comprising means disposed within the enclosure in spaced relation to the rear wall for acoustically coupling the driver to the air within the enclosure and to materials



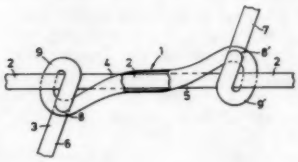
forming the enclosure, the coupling means comprising at least one acoustical resonator disposed within the enclosure, the resonator including a frame and a sheet-like screen formed of flexible, nonresonant material mounted in a substantially stretched configuration by the frame.

4,714,134

SAFETY BELTS AND THE LIKE

Fredrik A. Grufman, 13, Larsbergsvägen, 181 38 Lidingö, Sweden

PCT No. PCT/SE85/00386, § 371 Date Jun. 10, 1986, § 102(e) Date Jun. 10, 1986, PCT Pub. No. WO86/02278, PCT Pub. Date Apr. 24, 1986
PCT Filed Oct. 8, 1985, Ser. No. 872,655
Claims priority, application Sweden, Oct. 10, 1984, 8405074
Int. Cl.[4] A62B *1/16*
U.S. Cl. 182—3 **7 Claims**



1. A safety belt, comprising:

a first rope; and

a hose-shaped second rope rope having an inner diameter that expands radially at times when said second rope is compressed axially and contracts radially at times when said second rope is extended axially, said second rope including axially spaced apart first and second openings defining a tubular lead-through therebetween, said first rope passing through said first and second openings of said second rope so that a portion of said first rope is contained in said lead-through, said second rope being looped around said first rope to form first and second knotted portions respectively surrounding said first and second openings;

whereby moving said first and second knotted portions toward each other permits said first rope to move axially through said lead-through of said second rope and moving said first and second knotted portions away from each other locks said lead-through to said portion of said first rope contained in said lead through.

4,714,135

RAPPEL RESCUE SYSTEM

Robert L. Bell, Verona, N.J., and Joseph J. Dillon, Malverne, N.Y., assignors to Rappel Rescue Systems, Inc., Fairfield, N.J.

Filed Jan. 22, 1986, Ser. No. 820,962
Int. Cl.[4] A62B *1/14, 35/00*
U.S. Cl. 182—6 7 Claims

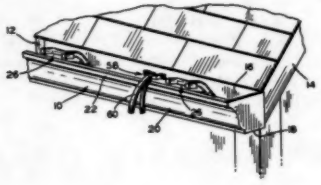
1. A rappel rescue system adapted to be worn by rescue personnel which comprises a body harness, a fastening means for attaching said body harness to a carrier pouch and said carrier pouch containing therein a snap ring secured to one end of a rappel line, an appropriate length of said rappel line in a deployment bag, an edge guard protective pad movable along said rappel line, a figure-of-eight descender pre-rigged on to said rappel line and an end-stop ring secured to the end of said rappel line.

4,714,136

LADDER SUPPORT FOR EAVESTROUGH OR GUTTER

Fernand R. Morin, Windsor, Canada, assignor to Wolverine Aluminum Distributing Ltd., Windsor, Canada

Filed May 7, 1987, Ser. No. 46,645
Int. Cl.[4] E04D *13/04;* E06C *7/48;* E04G *21/24*
U.S. Cl. 182—107 21 Claims



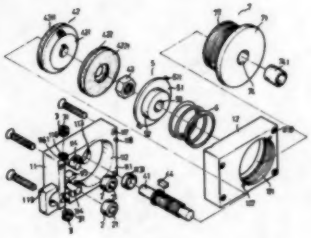
1. A ladder support to be mounted in an eavestrough for supporting a ladder spaced in front of a front rim of the eavestrough, said support comprising two main legs having means at first ends adapted to engage the eavestrough at the juncture of a back wall and a bottom thereof, said legs being of sufficient length to extend above and beyond the front rim of the eavestrough, means at second ends of said legs to engage the ladder and resist sideways movement thereof, outwardly-extending legs connected to intermediate portions of said main legs, and means at outer ends of said outwardly-extending legs for engaging the rim of the eavestrough for resisting movement of said main legs.

4,714,137

BUILDING SAFETY RESCUE DEVICE

Hung-Chang Chou, No. 5, Shin Ho 2nd Road, Tainan, Taiwan

Filed Apr. 29, 1986, Ser. No. 857,094
Int. Cl.[4] A62B *1/14*
U.S. Cl. 182—193 2 Claims



1. A building safety survival rescue cable device, comprising:

a lower shell casing having a cutout portion therein with an opening therethrough and also having side walls with a pair of cable guide holes passing therethrough;

a pair of pulley shafts secured in the cutout portion of the lower shell casing;

a pair of relatively small pulleys engaged with the pair of pulley shafts;

a mandrel being arranged in the lower shell casing and having one end passing through the opening in the cutout portion of the lower shell casing;

a pair of braking elements mounted on the mandrel in the cutout portion of the lower shell casing;

a large pulley engaged between the pair of braking elements;

an upper shell casing secured over the lower shell casing and having a cutout portion aligned with the cutout portion of the lower shell casing;

a compression means, mounted on the mandrel, for acting upon the pair of braking elements;

a compression spring means, arranged around the mandrel, for forcing the compression means into engagement with the pair of compression means; and

a descent speed adjustment button secured in the cutout portion of the upper shell casing, said button having an opening for engaging an opposite end of the mandrel, said button also having a bolt portion for exerting force upon the compression spring means, and said button further having a knob handle means for changing the amount of force exerted by the bolt portion upon the compression spring means.

4,714,138

ENGINE SUMP DRAINING DEVICE

Samuel G. Zaccone, 1315 N. 13th Ave., Melrose Park, Ill. 60160

Filed Sep. 5, 1986, Ser. No. 903,704
Int. Cl.[4] F16D *3/14, 1/12*
U.S. Cl. 184—1.5 2 Claims

1. A device for draining fluid from an engine sump of the type having a threaded drain plug comprising:

a housing having an open end and a closed end;

annular sealing means mounted to said housing for forming a fluid tight seal between the sump and the open end of said housing;

a shaft extending into said housing through an opening in the closed end thereof;

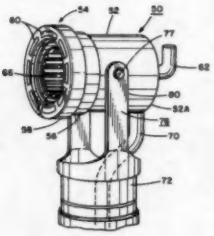
resilient sealing means forming a fluid tight seal between said shaft and said closed end of said housing while permitting axial and rotational movement of said shaft with respect to said closed end;

socket means connected to the end of said shaft within said housing for non-rotatably engaging said plug for removal

thereof from said sump upon rotational movement of said shaft;

a flexible drain tube connected over an opening in said housing for draining said housing of fluid following removal of said plug from said sump,

a yoke pivotably mounted to said housing for swinging



movement about an axis extending in a direction transverse to the longitudinal axis of said shaft,

tubular means carried by said yoke,

said tubular means having an open end disposed in proximity to said yoke, and

said drain tube extends into said open end of said tubular means.

4,714,139

LUBRICATING SYSTEM FOR GAS TURBINE ENGINES AND PUMP FOR SUCH A SYSTEM

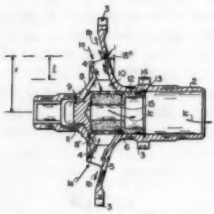
Joachim Lorenz, Riedenzhofen, and Martin Gattinger, Eichenhofen, both of Fed. Rep. of Germany, assignors to MTU Motoren-und Turbinen Union Muenchen GmbH, Munich, Fed. Rep. of Germany

Filed Sep. 24, 1986, Ser. No. 911,293

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535107

Int. Cl.[4] F01M *9/06*

U.S. Cl. 184—6.11 **12 Claims**



1. A pump for separating a gas from a liquid, comprising pump housing means (**106**), a pump wheel, hollow shaft means for rotatably supporting said pump wheel in said pump housing means and for providing a gas discharge duct for venting separated gas, approximately radially extending flow channels in said pump wheel, porous filter means (**6**) located in a central zone of said hollow shaft for cooperation with said flow channels, said porous filter means having a large surface area relative to a volume of said porous filter means, screen drum means surrounding said filter means, said screen drum means having screen openings which are relatively large compared to pores in said porous filter means, said porous filter means being connected to said radial channels through said relatively large openings in said screen drum means, and wherein said pump wheel has a wall extending outwardly beyond the radial channels and forming a wheel disk having an outer circumference provided with drive means for driving said pump wheel.

4,714,140

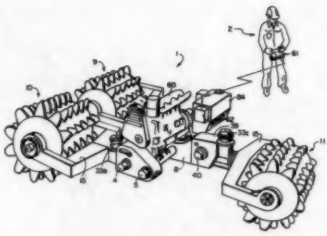
MULTI-AXIS ARTICULATED ALL TERRAIN VEHICLE

John H. Hatton, 5275 Craner Ave., North Hollywood, Calif. 91601, and Gregory L. Batt, #2 8741 Montcalm Street, Vancouver, British Columbia, Canada (V6; 4R1)

Filed Mar. 17, 1986, Ser. No. 840,591

Int. Cl.[4] B62D *57/02*

U.S. Cl. 180—20 **16 Claims**



1. A multi-axis all terrain vehicle comprising, in combination:

a frame having a front end and a rear end and a longitudinally extending central axis;

a pair of front wheel assemblies each including a rotatably mounted wheel;

means for mounting said front wheel assemblies on said frame front end in laterally spaced relationship on opposite sides of said central axis;

said front wheel assemblies mounting means arranged to permit each of said front wheel assemblies to pivot independently on a vertical steering axis, to pivot independently on a transverse horizontal axie and to rotate independently on an axis parallel to said frame central axis for rocking when traversing a hill;

a rear wheel assembly including a rotatably mounted wheel;

means for mounting said rear wheel assembly on said frame rear end on said central axis;

said rear wheel mounting means arranged to permit said rear wheel assembly to pivot on a vertical axis, to pivot on a transverse horizontal axis and to rotate on an axis corresponding to said frame central axis for rocking when traversing a hill;

said wheels having an axial length sufficient for supporting said frame in an upright orientation; and

means for driving at least one of said wheels.

4,714,141

BABY CARRIAGE WHEEL STOPPING DEVICE

Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

Filed Sep. 9, 1986, Ser. No. 905,783

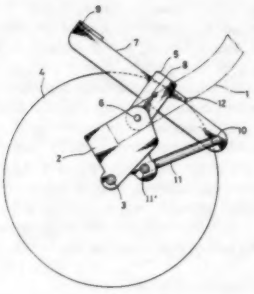
Claims priority, application Japan, Sep. 24, 1985, 60-145837[U]

Int. Cl.[4] B62B *9/08*

U.S. Cl. 188—20 **1 Claim**

1. A wheel stopping device for a baby carriage comprising carriage rear leg means having a lower end, base means (**2**) rigidly secured to said lower end of said rear leg means, rear wheel means (**4**) and axle means (**3**) for rotatably mounting said rear wheel means to said base means, a lever support member (**5**), first journal means (**6**) turnably connecting one end of said lever support member to said base means, an operating lever (**7**), second journal means (**8**) turnably connecting said operating lever (**7**) to said lever support member (**5**) so that said operating lever (**7**) forms a rocker type lever, one end of said operating lever extending rearwardly for forming an operating portion to be operated by a foot, the other end of said operating lever (**7**) having a through-hole (**10**), a brake rod (**11**), third journal means (**11'**) pivotally connecting one end of said brake

rod to said base means said brake rod being bent to extend outwardly along a lateral surface of said rear wheel means, said brake rod having a bent again portion extending through said through-hole (10) of said operating lever (7) to form fourth journal means, said bent again portion being positioned out of contact with an outer peripheral surface of said rear wheel means when said operating lever (7) is in a released position in which said first journal means (6) and said second journal means (8) are located approximately on a common radial line through said axle means (3), said base means (2), said lever support member (5), said operating lever (5), and said brake



rod (11) being shaped and positioned relative to one another so that said first, second, and fourth journal means lie substantially in alignment on a chord line of said rear wheel means with said first journal means (6) disposed between said second journal means (8) and said fourth journal means (10) for pressing said bent again portion of said brake rod against the outer peripheral surface of said rear wheel means to thereby inhibit the rotation of said rear wheel means when said operating lever (7) is pushed into a braking position in which said operating lever is self-locked due to said alignment of said first, second, and fourth journal means on said chord line.

4,714,142

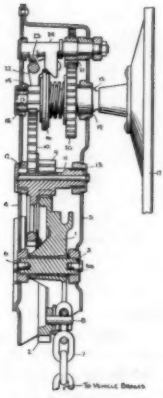
RAILWAY CAR HAND BRAKE WITH RELEASE GOVERNOR

Robert W. Shepherd, Hamburg, N.J., assignor to Ellcon-National, Inc., Totowa, N.J.

Continuation-in-part of Ser. No. 613,470, May 24, 1984, abandoned. This application Jun. 2, 1987, Ser. No. 57,731

Int. Cl.[4] **G05G** *1/08;* **F16D** *51/10*

U.S. Cl. 188—185 **13 Claims**



1. A brake operating mechanism for the brakes of a vehicle which apply a variable load on said mechanism as the brakes are released comprising:

a rotatable, wind-up drum with means for connecting it to the brakes of said vehicle, said drum being rotatable in a wind-up direction for setting the brakes of said vehicle with a predetermined braking force on such connecting means and being rotatable in the opposite, unwinding direction for releasing said brakes of said vehicle, said drum having a brake setting position when it is wound-up in said wind-up direction and applies said predetermined braking force to said brakes and having a brake release position when it is unwound in said unwinding direction and said brakes are released;

a rotatable shaft;

drive means including a plurality of gears interconnecting said rotatable shaft and said rotatable, wind-up drum for causing rotation of said rotation of said rotatable, wind-up drum in said wind-up direction with rotation of said rotatable shaft and rotation of the gears in first directions;

detent means coupled to said rotatable shaft for preventing rotation thereof in a second direction and thereby, preventing rotation of said gears in second directions opposite to said first directions and preventing rotation of said wind-up drum in said opposite unwinding direction; and

release means for disabling said detent means with respect to preventing rotation of said gears in said second directions; wherein the improvement comprises:

braking means coupled to one of said gears for applying a braking force which is sufficient to retard the rotation of said gears in said second direction when the force applied to said connecting means is less than about 30% of said predetermined braking force but which is insufficient to cause significant retardation of said rotation of said gears when said force applied to said connecting means is greater than about 30% of said predetermined braking force for thereby permitting said gears to rotate upon initial release of said release means at a rate which is substantially unaffected by said braking means but which is thereafter substantially reduced by said braking means and reduces wear on said gears and prevents damage to said brake operating mechanism during rotation of said gears in said second directions, said braking means being responsive to the rate of rotation of said one of said gears for applying a retarding force opposing rotation of said gears in said second directions which is independent of any force maintained on said release means, which is dependent upon the rate of rotation of said one of said gears and which increases with an increase in the rate of rotation of said one of said gears to a value which is insufficient to significantly retard the rate of rotation of said gears upon initial release of said release means and hence, of said wind-up drum in said unwinding direction, said braking means exerting insignificant rotation retarding action on said one of said gears when said one of said gears is rotated at a rate produced by manually rotating said shaft even when said release means is operated whereby said one gear is not retarded in rotation when said shaft is manually rotated to apply said brakes of said railway car and said brakes connected to said wind-up drum are fully released independently of said release means after it has been operated to disable said detent means.

4,714,143

HANDLE AND PANEL ASSEMBLY FOR PORTFOLIO

Frank Saliba, 115 W. 30th St., New York, N.Y. 10001

Filed May 5, 1986, Ser. No. 859,483

Int. Cl.[4] **A45C** *3/02, 13/22*

U.S. Cl. 190—115 **3 Claims**

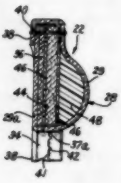
1. In a retractable inverted U-shaped handle having a bight portion, front and rear covers, and legs downwardly extending from the bight portion in combination with an outer pocket of a portfolio, said pocket having an outer finished cover, a lining, apertures in said cover and lining for said handle permitting

reciprocation into said pocket between said outer cover and lining, that improvement consisting of:

a laminated hand grasp portion of said handle located at the top between the legs thereof consisting of a front cover wrap-around portion of sheet material defining a mound-like protuberance at the bottom and a rear portion of sheet material extending from said front portion;

a mound shaped pad of synthetic foam plastic which is held within said front wrap-around portion;

a flat fiberboard reinforcement element having a width



slightly smaller than said hand grasp portion adhered to said pad by adhesive means;

said bight portion of said rear cover being adhesively laminated to said fiberboard reinforcement element and including an inside rear portion which provides part of the rear cover of said handle; and

said front wrap-around portion and said inside rear portion being stitched together at the top outer edge of said handle by stitching passing through said fiberboard reinforcement element, said inside rear portion and both said front and rear portions.

4,714,144

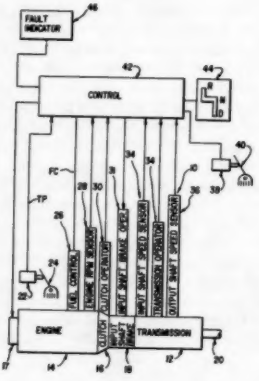
METHOD FOR CONTROLLING AMT SYSTEM START FROM STOP OPERATION

Donald Speranza, Canton, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Apr. 18, 1986, Ser. No. 853,483

Int. Cl.[4] B60K *41/02*

U.S. Cl. 192—0.084 **7 Claims**



1. A method for controlling a vehicle automatic mechanical transmission system for vehicles having an operator actuated throttle pedal, a throttle-controlled engine, a transmission having a plurality of gear ratio combinations selectively engageable between a transmission input shaft and a transmission output shaft, said transmission input shaft being operatively connected to said engine by means of a selectably engageable and disengageable friction coupling, said automatic mechanical transmission system comprising an information processing unit having means for receiving a plurality of input signals including (1) an input signal indicative of the rotational speed of the engine; and (2) an input signal indicative of the operator's setting of the throttle pedal, said processing unit including means for processing said input signals in accordance with a program for generating output signals whereby said transmission system is operated in accordance with said program, and means associated with said transmission system effective to actuate said transmission system to effect engagement of said gear ratio combinations in response to said output signals from said processing unit,

said processing unit having means to sense vehicle start from stop operation and, in a vehicle start from stop operation, issuing output signals to control means for controlling the amount of engagement of said friction coupling, said control means having a first state in which said friction coupling is completely disengaged, a second state in which said friction coupling is completely engaged and a third state occurring during the transition from said first state to said second state, when said friction coupling engageable elements are partially engaged, said control means being operative during said third state to engage said coupling elements sufficiently to maintain the speed of rotation of said engine at a value in predetermined relation to the adjustment position of said throttle whereby a function E is minimized where:

E is a function of N−A

where:

N is a value indicative of engine speed,

A is a value indicative of a predetermined desired engine speed at current throttle position;

the method characterized by:

calculating the value of E;

comparing the value of E to a predetermined reference value; and

preventing increased supply of fuel to the engine, regardless of the throttle pedal setting, if E is equal to or greater than said reference value.

4,714,145

SPEED RESPONSIVE CONTROL FOR OPERATING VEHICLE CLUTCH

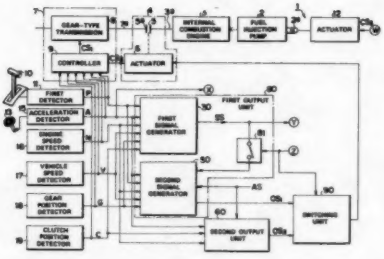
Kazumasa Kurihara, and Kenji Arai, both of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Oct. 23, 1986, Ser. No. 922,361

Claims priority, application Japan, Oct. 30, 1985, 60-243412

Int. Cl.[4] B60K *41/28*

U.S. Cl. 192—0.052 **16 Claims**



1. A clutch controlling apparatus for automatically carrying out the operation of a clutch device operated in response to an electric signal in relation to the amount of operation of an accelerator pedal; said apparatus comprising:

a first means for producing a first signal relating to the amount of operation of the accelerator pedal;

a second means for producing a second signal relating to the operating speed of the accelerator pedal;

a first output means responsive to the first signal for producing a first operation control signal for carrying out the complete engaging operation of the clutch device in relation to the amount of operation of the accelerator pedal;

a second output means responsive to the first signal for producing a second operation control signal for operating the clutch device in a semi-engaged state at an amount of semi-engagement related to the amount of operation of the accelerator pedal; and

a third means responsive to the first and second signals for selectively supplying to the clutch device either the first or second operation control signal in accordance with the amount and speed of operation of the accelerator pedal.

4,714,146

FRICTION COUPLING ELEMENT OF AUTOMATIC TRANSMISSION

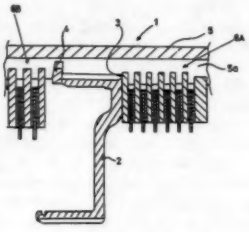
Shuzo Moroto, Handa; Koji Sumiya, Nishio; Kazuaki Watanabe, Toyota; Seitoku Kubo, Toyota; Koji Kobayashi, Toyota, and Yutaka Taga, Aichi, all of Japan, assignors to Aisin-Warner Limited, Anjo and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Aug. 6, 1985, Ser. No. 763,006

Claims priority, application Japan, Aug. 6, 1984, 59-165513; Aug. 8, 1984, 59-166960

Int. Cl.[4] F16D *13/68, 25/10;* **B60K** *17/02*

U.S. Cl. 192—85 AA **5 Claims**



1. In an automatio transmission with a stationary or rotational member; a first friction coupling device for selectively engaging a first rotatable member to the stationary or rotational member and having a first friction element engaged with an axially extending internal spline formed on the stationary or rotational member, and a first hydraulic servo producing an operational load; and a second friction coupling device for selectively engaging a second rotatable member to the stationary or rotational member and having a second friction element engaged with said spline formed on the stationary or rotational member, and a second hydraulic servo producing an operational load, said first and second friction coupling devices being mounted in the stationary or rotational member in a longitudinal direction; a support mechanism for said friction coupling devices comprising:

a hydraulic servo drum having an outer cylinder engaged with said spline formed on the stationary or rotational member, a side wall connected to said outer cylinder and an inner cylinder connected to said side wall to form said second hydraulic servo;

a snap ring mounted on said stationary or rotational member at one side of said hydraulic servo drum and adapted to receive the operational load of said first friction coupling device through said hydraulic servo drum, said snap ring being in the form of a tapered ring; and

a stepped portion formed on said stationary or rotational member at the other side of said hydraulic servo drum and adapted to receive the operational load of said second friction coupling device through said hydraulic servo drum.

4,714,147

DOUBLE CLUTCH FOR A MOTOR VEHICLE TRANSMISSION

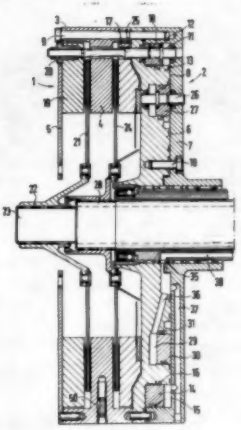
Imre Szodfridt, Stuttgart, and Richard Knoblauch, Ditzingen, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 25, 1986, Ser. No. 889,248

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1985, 3526630

Int. Cl.[4] F16D *25/10*

U.S. Cl. 192—87.15 **17 Claims**



1. A double clutch for alternately coupling a central shaft and a hollow shaft concentric thereto of a change-speed transmission of a motor vehicle with a housing means of the double clutch adapted to be operatively connected with an engine crankshaft, comprising first and second clutch disk means, center plate means operatively connected with the clutch housing means to rotate in unison therewith, hydraulic piston means for alternately pressing the first clutch disk means operatively connected with the central shaft from one side against the center plate means and for pressing the second clutch disk means operatively connected with the hollow shaft from the other side against the center plate means, said hydraulic piston means being constructed as a plurality of annular pistons, and hydraulic plate means, the annular pistons being secured in said hydraulic plate means, said hydraulic plate means being operatively connected with the clutch housing means, and several pin means substantially symmetrically extending through said annular pistons which upon pressure actuation of the annular pistons act on the clutch disk means by way of a pressure plate means.

4,714,148

PROGRESSIVELY ACTING FRICTION DISK SUITABLE FOR AUTOMOBILE VEHICLE CLUTCHES

Jacques Alas, Eaubonne, and Michel Bacher, Domont, both of France, assignors to Valeo, Paris, France

Filed May 30, 1985, Ser. No. 739,366

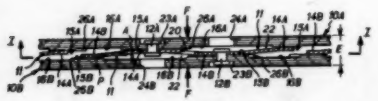
Claims priority, application France, May 30, 1984, 84 08525

Int. Cl.[4] F16D *13/64, 69/04*

U.S. Cl. 192—107 C **14 Claims**

1. Friction disk comprising circumferentially distributed support vanes and two annular friction facing members at its periphery, said friction facing members being disposed one on each side of said support vanes and each friction facing member being axially fastened to said support vanes but axially mobile relative to one another, each of said support vanes including a bent sheet metal member having a bent disengaged configuration in which said friction facing members are rela-

tively remote from one another and an oppositely bent engaged configuration in which said friction facing members are close together, and said support vanes featuring a circumferential succession of bends delimiting a circumferential succession of bearing surfaces for one of said friction facing members alternating with bearing surfaces for the other of said friction facing members, and said friction facing members having bearing areas which cooperate with said bearing surfaces and recesses between said bearing areas axially recessed relative to said bearing areas, a part of said sheet metal member constituting



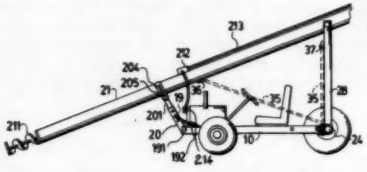
each of said support vanes located between the bearing surface for one of said friction facing members and the bearing surface for the other of said friction facing members being flexed when said friction facing members are moved towards one another, whereby said part of said sheet metal member has a positive slope for one of the engaged or disengaged configurations of the corresponding support vane and a negative slope for the other of the engaged or disengaged configuration of the corresponding support vane after passing through a partially engaged configuration where each vane is substantially flat and has substantially no slope.

4,714,149

SELF PROPELLED AUGER AND SEPARABLE VEHICLE THEREFOR

Edward Tiede, 1360 Elm Street, Kelowna, British Columbia, Canada V1Y 3W6

Filed Oct. 9, 1986, Ser. No. 917,198
Int. Cl.[4] B65G *21/10*
U.S. Cl. 198—312 **19 Claims**



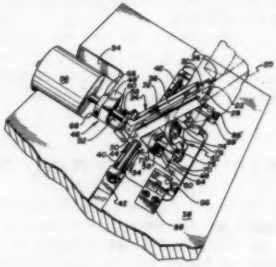
1. A vehicle for propelling an auger, said auger including an elongate auger tube, an axle having ground wheels thereon and strut means for supporting the auger above the axle, said vehicle comprising a frame having one end and an an end opposed thereto, a pair of ground wheels on the frame for supporting said one end of the vehicle, means on the frame at said opposed end of the vehicle adapted for releasably coupling the frame to the axle of the auger whereby the frame can be supported on said pair of ground wheels and on said axle of said auger such that when attached the frame is supported on the pair of ground wheels and on the axle, an engine on the frame, drive transmission means for transmitting drive from said engine to said engine to said pair of ground wheels and steering means for steering movement of said pair of ground wheels.

4,714,150

DROP SHUTTLE

Steven G. Kantrud, Crystal; Steven V. Ericson, Wyoming, and Karl R. Seidel, Jr., St. Paul, all of Minn., assignors to Micro Component Technology, Inc., St. Paul, Minn.

Filed Sep. 4, 1985, Ser. No. 772,361
Int. Cl.[4] B65G *37/00*
U.S. Cl. 198—463.3 **11 Claims**



1. Apparatus for receiving an integrated circuit device passing down an inclined platen to a pick-up station, transporting the device laterally with respect to a direction in which the device has passed down the platen, and depositing the device into an output chute, comprising:

(a) a shuttle having an entrance at one end registrable with the station and the chute;

(b) a shaft mounting an end of said shuttle opposite said end having said entrance for pivoting thereabout and lateral movement therealong between a first position in registration with the station and a second position in registration with the chute;

(c) a drive arm for concurrently moving said shuttle laterally and pivoting said shuttle between said first and second positions, said arm having a first end at which it is mounted for pivoting to define a plane generally perpendicular to a plane defined by an axis aligned along the direction in which the device has passed down the platen and an axis about which said drive arm pivots, and a second end at which it is operatively connected to said shuttle; and

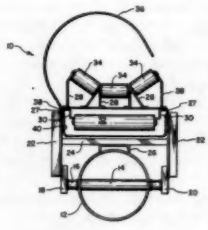
(d) actuation means for pivoting said drive arm.

4,714,151

APPARATUS FOR SUPPORTING AND ENCLOSING CONVEYOR SYSTEMS

Colin D. Campbell, West Jordan, and David R. Campbell, Salt Lake City, both of Utah, assignors to Cambelt International Corporation, Salt Lake City, Utah

Filed Apr. 30, 1986, Ser. No. 858,012
Int. Cl.[4] B65G *21/00*
U.S. Cl. 198—860.5 **5 Claims**



1. An apparatus for supporting and totally enclosing a belt conveyor system comprising:

an elongated structural support tube;
a plurality of internal support pipes disposed generally transversely within the interior of the elongated structural support tube such that when the apparatus is in operation the internal support pipes lie in the generally horizontal plane;
a plurality of auxiliary support pipes disposed within the center of the internal support pipe;
struts securely attached to each end of the auxiliary support pipes and extending generally upwardly;
braces attached to each pair of struts at a point on said struts such that the braces are disposed above the structural support tube and are positioned generally parallel to the auxiliary support pipes;
support brackets securely attached to the underside of the braces and resting on the structural support tube;
trusses attached to the tops of said struts and running in a generally horizontal direction parallel to a belt conveyor system;
a belt conveyor system attached to said trusses and disposed above said braces;
a top cover attached to at least one truss and configured such that when in place it covers said belt conveyor system; and
a lower enclosure attached to at least one truss and configured such that when in place it cooperates with the top cover to totally enclose said belt conveyor.

4,714,152

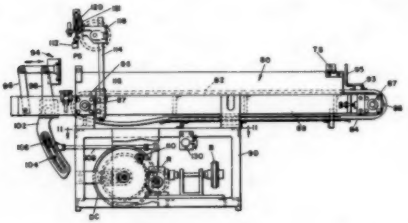
ACCUMULATOR

Graham J. Ross, Hingham, Mass., assignor to Pneumatic Scale Corporation, Quincy, Mass.

Continuation of Ser. No. 720,707, Apr. 8, 1985, abandoned. This application Mar. 19, 1987, Ser. No. 28,074

Int. Cl.[4] B65G *1/00*

U.S. Cl. 198—347 **10 Claims**



1. Apparatus for transporting articles comprising a first conveyor defining a horizontal supporting surface movable along a predetermined path for transferring articles in single file along said path, an accumulator arranged adjacent said first conveyor comprising a second conveyor defining a horizontal supporting surface in the plane of the supporting surface of the first conveyor with one end adjacent but spaced from the first conveyor and the other end remote therefrom, the supporting surfaces of said second conveyor being movable toward and away from the supporting surface of the first conveyor, a dead plate disposed between the first and second conveyors having a supporting surface in the plane of the supporting surfaces of the first and second conveyors, a stabilizer bar mounted above the dead plate for vertical movement up and down relative to the dead plate for clamping articles moved onto the dead plate to the dead plate, a pusher bar disposed at the side of the first conveyor opposite the second conveyor for reciprocal movement transversely of the first conveyor to a position adjacent the dead plate to move articles from the first conveyor onto the dead plate, a backup bar disposed above the second conveyor at the side of the dead plate remote from the first conveyor movable in one direction of movement with the second conveyor to stabilize containers on the second conveyor following elevation of the statilizing bar from the tops of the containers to release the containers for movement as the containers are moved from the dead plate onto said second conveyor and in an opposite direction with the second conveyor to displace the containers resting on the dead plate from the dead plate onto the first conveyor, and means for sequencing movement of the pusher bar, stabilizer bar, second conveyor and backup bar such that the transfer of articles from the first conveyor to the dead plate is effected by elevation of the stabilizer bar and movement of the pusher bar transversely of the first conveyor to push the articles from the first conveyor onto the dead plate into engagement with the backup bar, followed by lowering of the stabilizer bar into engagement with the articles pushed onto the dead plate into engagement with the backup bar and retraction of the pusher bar and displacement of the articles from the second conveyor is effected by movement of the second conveyor and backup bar into engagement with the articles held clamped to the dead plate by the stabilizer bar, followed by elevation of the stabilizer bar and movement of the second conveyor and backup bar in consonance to transfer the articles from the dead plate onto the first conveyor and control circuitry for sequencing operation of the pusher bar, stabilizer bar, backup bar and second conveyor to effect transfer and retransfer as a consequence of backup of articles downstream of the accumulator and clearance of the articles downstream of the accumulator.

4,714,153

DEVICE FOR TRANSPORTING CANS

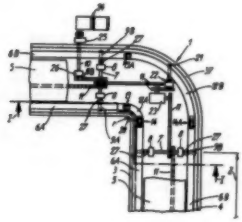
Jürg Bischofberger, Elsau, and Manfred Feige, Frauenfeld, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Jun. 1, 1984, Ser. No. 616,403

Claims priority, application Switzerland, Jun. 8, 1983, 3133/83

Int. Cl.[4] B65G *25/02*

U.S. Cl. 198—457 **8 Claims**



1. A can transporting device comprising
a vertical can guide system having a pair of vertical boards for guiding a can horizontally therebetween in a non-linear transport direction;
a horizontal guide plate between said boards for supporting the can thereon; and
a can feed means for moving the can in a horizontal stepwise manner along said guide plate and between said boards, said can feed means including two pairs of straight rails between said boards, each said pair of rails being connected to each other in parallel relation and in angular relation to the other pair of rails, a pair of curved rails interconnecting said pairs of straight rails, and means for simultaneously moving said straight and curved rails through an endless path with the can supported on said rails during a forward movement of said rails in said path and with said rails spaced below said guide plate during a rearward movement of said rails in said path.

4,714,154

MATERIAL AND TRANSFER LOADING APPARATUS

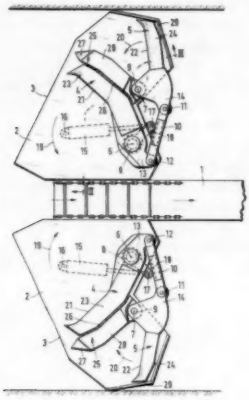
Karl Harhoff, Werne, and Egon Melis, Lünen, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia GmbH, Lunen, Fed. Rep. of Germany

Filed Dec. 16, 1986, Ser. No. 942,486

Claims priority, application Fed. Rep. of Germany, Dec. 27, 1985, 3546192

Int. Cl.[4] B65G *65/02*

U.S. Cl. 198—514 13 Claims



1. Loading apparatus for use in loading loose material; said apparatus comprising means defining a loading surface for receiving the material, first and second loading blades, means for pivotably supporting the blades relative to the loading surface, each loading blade having a first front face which extends at a relatively steep angle in relation to the loading surface and a second rear face which extends at a relatively shallow angle in relation to the loading surface, means for pivotably moving the loading blades in unison back and forth over the loading surface in a reciprocable manner in delivery and return strokes to cause the material to be transferred over the loading surfaces predominantly by the first faces of the blades and means defining a fixed step between the blades to assist the transfer of material by the blades, said step having a front face relative to the blade which is foremost relative to the delivery strokes which extends at a comparatively steep angle in relation to the loading surface.

4,714,155

RUNWAY FOR A CONVEYOR MEANS USING LINEAR MOTORS

Seiji Watanabe; Teiji Horimoto, both of Sano, and Susumu Koizumi, Oyama, all of Japan, assignors to Hitachi Kiden Kogyo Kabushiki Kaisha, Hyogo, Japan

Filed Dec. 3, 1985, Ser. No. 804,258

Claims priority, application Japan, Dec. 3, 1984, 59-183889[U]

Int. Cl.[4] B65G *35/00*

U.S. Cl. 198—619 3 Claims

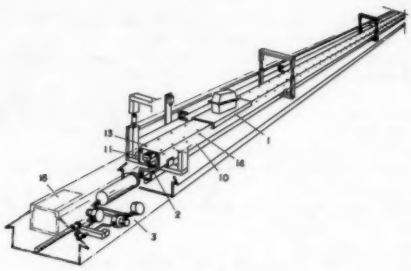
1. A runway for use in a conveyor of the type wherein a transportation pallet straddles the runway, is floated in the air by air discharged from the runway, and is moved along the runway by linear motors spaced along the runway, said runway comprising:

a longitudinal body of integral, one-piece construction, said body have an upper surface and opposite outwardly facing side surfaces;

an open space extending longitudinally through said body generally centrally thereof and forming an area for mounting linear motors within said runway;

two air ducts extending longitudinally through said body at positions symmetrically thereof and symmetrically of said open space;

upper air discharge holes extending through said body from each said air duct upwardly to said upper surface;



lateral air discharge holes extending through said body from each said air duct outwardly to the respective said side surface;

said upper and lateral air discharge holes being spaced longitudinally along said body.

4,714,156

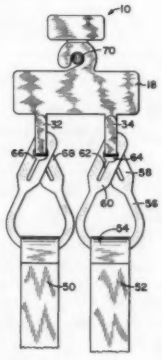
HANGER FOR SUSPENDERS

Chester Kolton, Westfield, and Stuart S. Spater, Livingston, both of N.J., assignors to B&G Plastics, Inc., New York, N.Y.

Filed Jul. 7, 1986, Ser. No. 882,486

Int. Cl.[4] A47G *25/36, 25/48*

U.S. Cl. 206—296 3 Claims

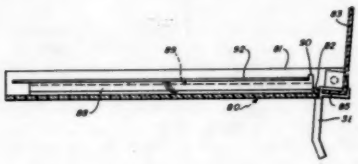


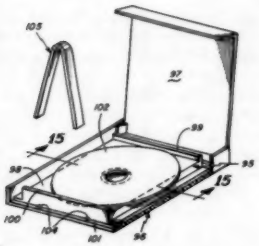
1. In combination, suspenders of the type having first and second straps, each strap having a pair of stems connected therewith, each stem having a slot extending therethrough for receipt of a trouser button in use of said suspenders, and a display hanger comprising an integral flat body having a hook portion and a lower portion, said lower portion including first and second mutually transversely spaced elongate members depending from said lower portion and including openings therethrough adjacent said lower portion, each said member being folded upon itself and having a projection extending therefrom, each said projection being retentively resident in said opening of said member thereof, said elongate members being configured in cross-section to permit passage thereof through said slots of a stem pair and configured in length such that two stems are resident in each said member in such folded condition.

4,714,157
MEDIA STORAGE APPARATUS

James V. Morrone, 25 Sea Foam Ave., Winthrop, Mass. 02152

Filed Jul. 18, 1985, Ser. No. 756,716
Int. Cl.[4] B65D *85/57*
U.S. Cl. 206—309 16 Claims





1. A storage case for the disk-type media comprising a base and cover and hinge means intercoupling the base and cover to permit the storage case to fold between closed and open position, in combination with a pick-up means adapted for insertion in the hole in the disk for picking the disk up, said pick-up means comprising a hand held fork member having opposite resilient legs adapted to fit within the hole in the disk.

8. A storage case for a disk-type media comprising a base and cover and hinge means intercoupling the base and cover to permit the storage case to fold between closed and open positions, said cover having a rear wall, said base having a bottom wall terminating short of the rear of the base to provide a rear base opening defined in part by the base bottom wall rear edge, in combination with a removable clip for maintaining the cover in a substantially upright position in the open position of the case, said clip including a pair of said walls defining a recess into which the cover rear wall engages to hold the clip on the case, and means for engaging the base bottom wall rear edge only in the open position of the case and to so limit the open position to a substantially upright one.

4,714,158
MOLDED TOOL TRAY ASSEMBLY

John P. Oltman; Donald N. Sulentic, and Richard D. Purchase, all of Cedar Falls, Iowa, assignors to Waterloo Industries, Inc., Waterloo, Iowa

Continuation of Ser. No. 764,343, Aug. 12, 1985, abandoned.
This application Sep. 24, 1986, Ser. No. 910,866
Int. Cl.[4] A45C *11/26*
U.S. Cl. 206—349 6 Claims

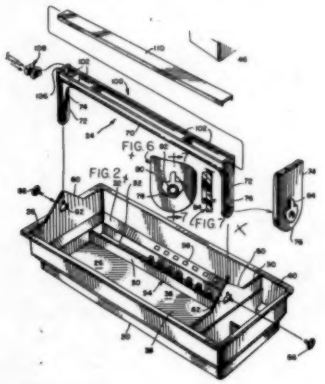
1. A tray assembly comprising, in combination:

a substantially rectangular tray member having a bottom, a sidewall and at least a first interior partition, said bottom and said sidewall defining a tray cavity having a predetermined length and width, said first interior partition secured to said sidewall across said width of said tray cavity so as to define a tray compartment and a storage compartment within said tray cavity;

a removable storage box adapted to securely fit within said storage compartment;

a pair of substantially parallel flanges extending from said sidewall and said first interior partition, said substantially parallel flanges being centrally aligned with respect to said width of said tray cavity, said substantially parallel flanges defining substantially aligned handle apertures; and

a handle extending between said substantially parallel flanges and including a grasping portion connecting two end portions, said end portions defining a pair of oppositely extending tabs adapted to engage said substantially aligned handle apertures, said handle being selectively rotatably between an operative position wherein the grasping portion may be manually encircled for grasping and carrying, and an inoperative position, said handle lying substantially adjacent and inside said sidewall in said inoperative position, whereby access is provided to the tray member and the handle does not overextend the side



wall, each of said substantially aligned handle apertures of said substantially parallel flanges including an upper substantially upright locking slot and a lower rotation-permitting opening, each of said oppositely extending tabs being rotatable with substantial freedom within said lower rotation-permitting opening of said substantially aligned handle apertures, said oppositely extending tabs including a key portion adapted to engage said upper substantially upright locking slot in said operative position;

said substantially parallel flanges and said handle end portions cooperatively defining lock means for selectively securing said handle in said operative position, whereby said substantially rectangular tray member is secured with respect to said handle; and

said handle grasping portion defining a handle storage area therein and including closure means for closing said handle storage area.

4,714,159
PACKAGE FOR SCISSORS

Olavi Lindén, Björkkulla, Finland, assignor to Oy Fiskars AB, Helsinki, Finland

Filed Aug. 28, 1986, Ser. No. 901,538
Claims priority, application Finland, Aug. 25, 1985, 853310
Int. Cl.[4] B65D *73/00*; B26B *29/04*
U.S. Cl. 206—349 3 Claims

1. A display package for an article of cutlery that comprises an elongated blade portion and a handle portion connected to one end of the blade portion and having a protruding head on one of said portions adjacent to the connection between them, said display package comprising a panel of cardboard or the like and an elongated sheath wherein said blade portion is received, said display package being characterized by:

A. said sheath

(1) being of substantially stiff material,

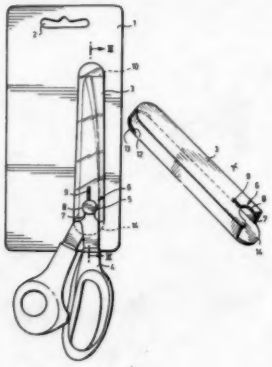
(2) having opposing spaced apart front and rear walls,

(3) having wall portions connected with said front and rear walls along the length of the sheath to define opposite sides thereof and cooperating with the front and rear walls to define a closed end of the sheath, the opposite end of the sheath being open for lengthwise insertion of said blade portion thereinto;

(4) the end of said rear wall comprising a pair of tongues,

(a) one of which projects endwise beyond the open end of the sheath and

(b) the other of which is defined by a slit in the sheath, in the closed end portion thereof, that is adjacent to said rear wall and has its length parallel to the surfaces thereof, and



(5) one of said walls being formed with a detent portion which is near said open end of the sheath and which is engageable with a snap action with said head as the blade portion is inserted lengthwise into the sheath, to releaseably confine the blade portion against withdrawl from the sheath; and

B. said panel having an elongated slot in which said sheath is closely receivable with

(1) said tongues overlying one surface of the panel adjacent to opposite ends of the slot,

(2) said front wall spaced beyond the opposite surface of the panel, and

(3) said handle portion overlying said opposite surface of the panel to cooperate with the tongues in confining the sheath against displacement out of said slot.

4,714,160

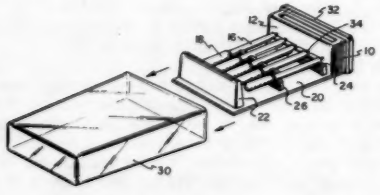
DISPENSER OF ARTICLES

Robert Bennett, Easton, Conn., assignor to RJS Industries Inc, Marlboro, N.J.

Filed Oct. 23, 1986, Ser. No. 922,329

Int. Cl.[4] B65D *85/24;* A45D *40/20*

U.S. Cl. 206—385 **5 Claims**



1. A dispenser of articles comprising:

a horizontally elongated rectangular base having first and second opposite flat surfaces;

a plurality of elongated spaced articles, each article consisting of an elongated rod having a coating on one end and secured at the other end by an integral short thin prong to the first base surface, said articles extending in a common direction perpendicular to the base and lying in a common plane;

an elongated support member lying in a plane parallel to said common plane and having two opposite ends, and being secured at one end to said base, said member being spaced from said articles;

a horizontally elongated plate parallel to said base and secured at one of its elongated edges to the other end of the member, said plate being disposed remote from said base and adjacent but spaced from the coated end of each of the articles;

first and second parallel elongated article support elements, the first element being secured to said member in a position adjacent said one member end and extending in a direction perpendicular to said common direction, the second element being secured to said member in a position intermediate the first element and the plate, each article contacting both of the elements; and

a transparent hollow cover detachably engaging the base with the second base surface being exposed to enclose the elements, plate, support member, and articles, the cover, when engaging the base, being spaced from the articles.

4,714,161

SECURITY CASSETTE HOLDER

Stanley R. Thorud, Brooklyn Center, Minn., assignor to Liberty Diversified Industries, Minneapolis, Minn.

Continuation-in-part of Ser. No. 771,342, Aug. 30, 1985, abandoned. This application Nov. 1, 1985, Ser. No. 794,088

Int. Cl.[4] B65D *25/10, 85/672*

U.S. Cl. 206—387 **7 Claims**

1. A tamper-proof display holder for a magnetic tape cassette comprising:

an elongated holder having a tape cassette storage compartment defined by top, bottom, side, and end wall segments;

an opening in one end of said compartment through which a tape cassette may be inserted into said compartment; and

restraint means for securely preventing the removal of said tape cassette from said storage compartment comprising an aperture through one of said wall segments adjacent to said opening, and a stop member having an elongated body extending through said aperture and projecting across the trailing side of a tape cassette with respect to its direction of insertion through said opening with said elongated body being located in blocking position with respect to said tape cassette trailing side a predetermined distance from a second wall segment of said compartment opposite said compartment opening to confine a tape cassette between said elongated body and said second wall segment, said stop member comprising a push fastener having a head extending transversely of said elongated body separated along the length of said elongated body from a shoulder extending transversely of said body, by a recessed neck tightly held in said aperture in forced-fit engagement therewith, with a portion of said one wall segment defining said aperture securely, directly engaged between said head and said shoulder, whereby said fastener cannot be removed.

3. A tamper-proof display holder for a magnetic tape cassette comprising:

an elongated holder having a tape cassette storage compartment defined by top, bottom, side, and end wall segments;

an opening in one end of said compartment through which a tape cassette may be inserted into said compartment; and

restraint means for securely preventing the removal of said tape cassette from said storage compartment comprising an aperture through one of said wall segments adjacent to said opening, and a stop member having an elongated body extending through said aperture and projecting across the trailing side of a tape cassette with respect to its direction of insertion through said opening with said elongated body being located in blocking position with respect to said tape cassette trailing side a predetermined distance from a second wall segment of said compartment opposite said compartment opening to confine a tape cassette between said elongated body and said second wall segment, said elongated body of said stop member terminating short of and in spaced-apart relation to a third wall segment of such storage compartment opposite said one wall segment having said aperture therein, whereby said third wall segment may not be pushed inwardly to contact said stop member in an effort to displace it.

7. A tamper-proof display holder for a magnetic tape cassette comprising:

an elongated holder having a tape cassette storage compartment defined by top, bottom, side, and end wall segments;

an opening in one end of said compartment through which a tape cassette may be inserted into said compartment; and

restraint means for securely preventing the removal of said tape cassette from said storage compartment comprising an aperture through one of said wall segments adjacent to said opening, and a stop member having an elongated body extending through said aperture and projecting across the trailing side of a tape cassette with respect to its direction of insertion through said opening with said elongated body being located in blocking position with respect to said tape cassette trailing side a predetermined distance from a second wall segment of said compartment opposite said compartment opening to confine a tape cassette between said elongated body and said second wall segment, said stop member having a head on its upper end; and

a recess formed within said one wall segment of said storage compartment, with said head being seated in said recess flush with the upper surface of said one wall segment.

4,714,162

FLUORESCENT LIGHT BULB HOLDER

Kim A. Harrison, P.O. Box 1224, Desoto, Tex. 75115

Filed Dec. 17, 1986, Ser. No. 942,601

Int. Cl.[4] B65D *85/42*

U.S. Cl. 206—419 **13 Claims**

1. A removable holder for receiving a plurality of fluorescent light bulbs, each bulb having first and second ends, the holder is for use with a ladder having a side rail, comprising:

first means for detachably mounting to the side rail of the ladder for receiving one end of the fluorescent light bulbs; and

second means for detachably mounting to the side rail of the ladder for receiving fluorescent light bulbs between the first and second ends thereof, said second means including a generally U-shaped member having parallel legs, such that a plurality of fluorescent light bulbs may be received between said parallel legs.

4,714,163

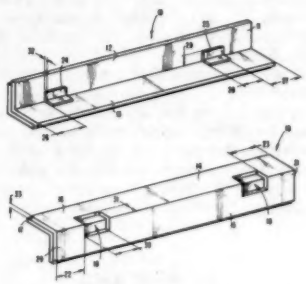
STACKABLE SHIPPING EDGE PROTECTOR

Robert E. Reeves, Indianapolis, Ind., assignor to Pakway Container Corp., Indianapolis, Ind.

Filed Feb. 5, 1987, Ser. No. 11,295

Int. Cl.[4] A47B *95/00*; B65D *81/02*

U.S. Cl. 206—518 **13 Claims**



1. A stackable shipping edge protector comprising:

a main body having a right angle shaped cross section extending substantially the length thereof and forming a pair of inwardly facing surfaces and a pair of outwardly facing surfaces; and,

pressure sensitive adhesive means provided on said pair of inwardly facing surfaces and having a first length and a first width being operable to removably secure said main body to a corner edge of a product to protect same during shipment thereof; and wherein:

said main body includes a recessed portion on said pair of outwardly facing surfaces aligned with said adhesive means located on said pair of inwardly facing surfaces, said recessed portion of a size greater than said adhesive means to nestably receive said adhesive means on an identical shipping edge protector stacked thereatop without adhesively securing stacked edge protectors together.

9. A stackable shipping edge protector comprising:

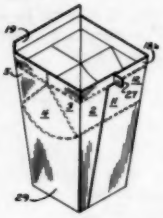
a multi-ply fibreboard main body having an L shaped cross section extending substantially the length thereof, said main body having an outer sheet and an inner sheet fixedly secured together, said outer sheet including a pair of openings extending therethrough with said inner sheet extending longitudinally with said outer sheet and extending over each of said pair of openings forming a pair of recesses in said main body opening outwardly; and,

a pair of exposed adhesive means to removably secure said main body to an external object, said adhesive means fixedly secured to said inner sheet to face inwardly being located adjacent said pair of recesses to be nestably received in a pair of recesses of an adjacent identical edge protector when stacked thereatop.

4,714,164
STACKING TAB FOR TAPERED CONTAINER

George Bachner, Barrington, Ill., assignor to Nimco Corporation, Crystal Lake, Ill.

Filed Dec. 16, 1985, Ser. No. 809,935
Int. Cl.[4] B65D *21/02*
U.S. Cl. 206—518 32 Claims



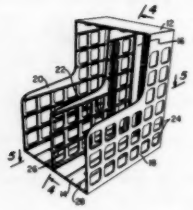
1. In a blank of foldable sheet material for a container having a tapered body and bottom closure arrangement, said blank having a side seam area for underlapping and a side seam area for overlapping, the underlapping and overlapping forming a sealed side seam area extending the length of said body, a destacking tab comprising:

a substantially rectangular abhesive area within said overlapping side seam area, said abhesive area adapted to resist sealing during formation of said sealed side seam area and adapted for folding to protrude in an erect position relative to said sealed side seam area upon sealing, said abhesive area having a width less than the width of said side seam area for overlapping whereby a continuous sealed side seam area is formable upon lapping and sealing.

4,714,165
STORAGE RACK

Jack Solomon, 169 Lindell Blvd., Long Beach, N.Y. 11561

Filed Jul. 17, 1985, Ser. No. 756,016
Int. Cl.[4] B42F *17/12*
U.S. Cl. 211—11 10 Claims



1. A storage rack comprising:

housing means formed with front, back and bottom panels, a partial top panel, and one side panel so that the housing is open on one side;

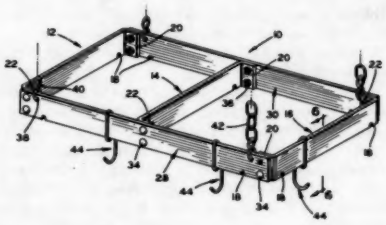
said partial top, bottom and side panels containing a plurality of correspondingly arranged tracks so that the tracks of the partial top and bottom panels meet the tracks of the side panel; and

at least one divider which is detachably engaged in and slideable along said tracks into and out of the open side of said housing, said divider including latching means for releasably locking said divider in said housing, said latching means including a part adapted to (i) resiliently project into a recess in said housing so as to detachably secure said divider when said divider is in position fully within said housing and (ii) withdraw from the recess so as to allow said divider to slide along said tracks, without tilting out of engagement with the tracks, when manual force is applied on the divider in the direction of the open side.

4,714,166
SUPPORTING RACK FOR COOKING UTENSILS

William L. Hann, Bryan, and Stanley E. Fuller, Toledo, both of Ohio, assignors to Commercial Aluminum Cookware Company, Perrysburg, Ohio

Continuation of Ser. No. 719,546, Apr. 3, 1985, abandoned. This application May 12, 1986, Ser. No. 861,932
Int. Cl.[4] A47F *5/08*
U.S. Cl. 211—113 1 Claim



1. A supporting rack for a plurality of cooking utensils comprising a bar of predetermined thickness, width and length, said bar having a notch in a lower longitudinal edge thereof near an end of said bar, a rigid suspending member supported by said bar for longitudinal movement therealong, said member being of a one-piece rod having a bar-engaging portion, a straight shank, and a hook, said bar-engaging portion comprising a straight web of a length exceeding the width of said bar, a structurally-integral end lip at one end of said web, extending outwardly from said web and back toward said web, a structurally-integral connecting lip at the other end of said web, extending outwardly therefrom in the same general direction as said end lip and back toward said web, said shank being structurally integral with an outer end of said connecting lip, extending away from said end lip, extending below said bar, and being substantially parallel to said web, said hook curving outwardly from said shank in a direction toward said connecting lip and being structurally integral with said shank, and said end lip, said connecting lip, and said hook being in a common plane, the minimum distance between the inner end of said notch and the opposite longitudinal edge of said bar being less than the minimum distance between the juncture of said end lip and said web and the outer end of said connecting lip at the juncture with said shank, said suspending member further comprising a second straight shank extending below said bar and being positioned in parallel relationship to and spaced from said first straight shank, said straight shanks being spaced apart a distance substantially exceeding the thickness of said bar to enable said bar-engaging portion to be turned and engaged with said bar, a second hook curving outwardly from said second shank in a direction away from said connecting lip and being structurally integral with said second shank, a straight connecting link having one end structurally integral with an upper end of said second shank and having another end structurally integral with an end of said end lip, said connecting link extending diagonally downwardly in the same direction as said end lip and maintaining said straight shanks in their spaced, parallel positions, said second hook, said connecting link, and said first hook being in a common plane.

4,714,167

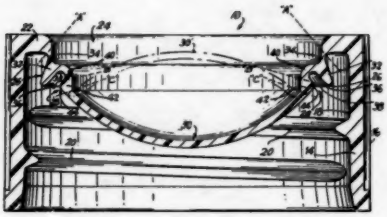
PLASTIC LINERLESS CLOSURE

Jeffrey Sandhaus, Rte. 9W, Sneden's Landing, Palisades, N.Y. 10964

Continuation of Ser. No. 675,603, Nov. 28, 1984, Pat. No. 4,574,966, which is a continuation-in-part of Ser. No. 549,477, Nov. 7, 1983, Pat. No. 4,550,841, which is a continuation-in-part of Ser. No. 441,546, Nov. 15, 1982, Pat. No. 4,479,585, which is a continuation-in-part of Ser. No. 399,237, Jul. 19, 1982, Pat. No. 4,442,945, which is a continuation-in-part of Ser. No. 335,216, Dec. 28, 1981, Pat. No. 4,413,742. This application Mar. 10, 1986, Ser. No. 838,116

Int. Cl.[4] B65D *41/04*

U.S. Cl. 215—270 **5 Claims**



1. A closure and container combination, comprising:

a container having an open end, said end having a top surface and an inner surface; and,

a closure, adapted to be applied to said open end of said container, having a skirt, and a top coupled to said skirt, said top including:

a sealing member adapted to engage said top surface of said end of said container with application of said closure to said end;

an inner sealing region having an outwardly facing sealing surface adapted to be situated contiguous with said inner surface of said end of said container with application of said closure to said end;

a central region coupled to said inner sealing region; and, means, coupled to said skirt, for enhancing engagement of said sealing member with said top surface of said end of said container in response to lifting of said inner sealing region relative to said skirt.

4,714,168

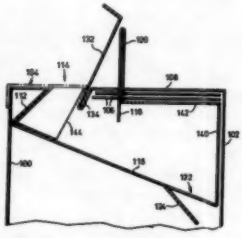
CONTAINER FOR DISPOSABLE EXPENDED MEDICAL SUPPLIES

William G. Johnson, 472 Indian Road, Burlington, Ontario, Canada L7T 3T3, and Gary B. Romagnoli, 41 Allan Drive, St. Catherines, Ontario, Canada L2N 1G1

Filed Jun. 30, 1986, Ser. No. 879,953

Int. Cl.[4] B65D *5/42, 5/46;* A61M *5/32*

U.S. Cl. 220—1 T **13 Claims**



1. A container for disposable syringes comprising a body structure defining an interior chamber and a laterally elongated upper opening in an upward and forward surface of the container, the opening having a length and width sufficient to accept expended medical syringes of commonly used sizes broadside on, an upwardly opening lid for covering the opening and connected by a hinge to the rear of the elongated opening for movement upward and away from the opening, a laterally elongated chute extending into the body structure and having a front wall extending downwardly and rearwardly from the opening to a lower opening into the chamber, a wall extending downwardly from the hinge of the lid into the chute to form within the chute and beneath the lid a labyrinth sufficiently restricted and tortuous to arrest passage of a human hand through a chute short of the lower opening of the latter, and a movable flap supported transversely in the lower opening of the chute for movement into the interior chamber, whereby to control passage to the rear of the lower end of the front wall of the chute, into the interior chamber, of a syringe dropped down the chute.

4,714,169

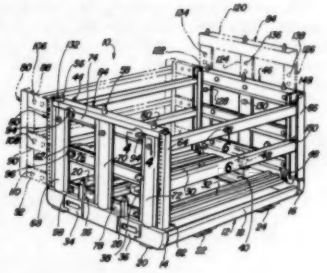
COLLAPSIBLE/EXPANDABLE SHIPPING RACK

Daniel J. Keenan, Rochester, and Donald A. Hoss, Southfield, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Mar. 26, 1987, Ser. No. 30,329

Int. Cl.[4] B65D *19/06*

U.S. Cl. 220—8 **5 Claims**



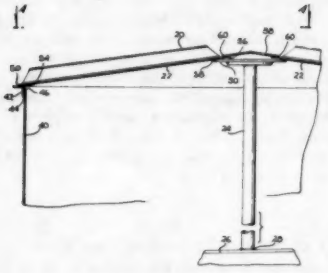
1. A collapsible/expandable shipping rack comprising a generally rectangular bottom wall, a pair of oppositely disposed end walls, hinge means securing each end wall at the lower marginal edges thereof to the bottom wall, each end wall adapted to be pivoted from an upright position to a collapsed position over the bottom wall, each end wall comprising a central support section which is secured by the hinge means to the bottom wall, a pair of width expanding sections, horizontal track means on the central support section, each of the width expanding sections being mounted on the horizontal track means for horizontal movement to expand or contract the width of the rack, first latching means on the central support section to releasably latch the width expanding sections in a desired position, a height expanding section, vertical track means on the central support section, the height expanding section being mounted on the vertical track means for vertical movement to expand or contract the height of the rack, second latching means on the central support section to releasably latch the height expanding section in a desired position, a plurality of side rails of a length to extend between the width expanding sections when the end walls are in an upright position to form a side wall structure, third latching means on the width expanding sections to releasably latch the side rails to the width expanding sections, the side rails maintaining the end walls in an upright position when latched in place and being removable by unlatching the third latching means to permit pivoting of the end walls into a collapsed position over the bottom wall.

4,714,170

LARGE STORAGE TANK STRUCTURES

Leslie D. Scott, Atascadero, Calif., assignor to Trusco Tank Inc., San Luis Obispo, Calif.

Filed Apr. 17, 1986, Ser. No. 853,132
Int. Cl.[4] B65D *6/32, 6/34*
U.S. Cl. 220—5 A **13 Claims**



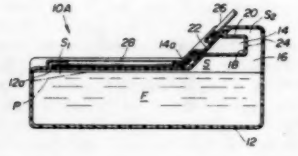
1. A storage tank comprising:
a welded steel floor having all continuous welds;
a welded steel cylindrical side wall continuous welded to said floor from both sides of said side wall;
a plurality of roof panels, at least some of said roof panels having at least one rafter continuous welded to the upper surface thereof spaced apart from the edges of said panels such that said upper surface of said panels remains substantially free from any such rafters immediately adjacent to said edges of said panels;
each of said roof panels being continuous welded along its edges directly to the edges of adjacent panels to form the roof of said storage tank with said rafters external thereto, said roof panels adjacent the periphery of said roof being continuous welded at least indirectly to the upper periphery of said side wall by continuous welds, whereby said floor, side wall and roof panels define a continuous welded storage tank enclosure.

4,714,171

FUEL TANK VENT SYSTEM

Michiaki Sasaki, Hadano, and Junya Ohno, Zama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 31, 1986, Ser. No. 948,041
Claims priority, application Japan, Jan. 10, 1986, 61-3010; May 6, 1986, 61-103587
Int. Cl.[4] F16K *45/00*; B65B *31/00*
U.S. Cl. 220—85 VR **14 Claims**



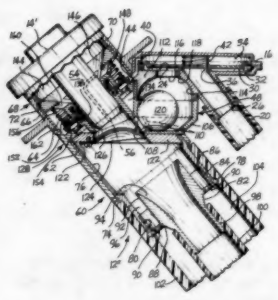
1. A fuel tank vent system comprising:
a fuel tank constructed of moulded plastics, said fuel tank being formed with a depressed portion which protrudes into a vapor chamber defined at an upper portion of the interior of the fuel tank;
a structure of moulded plastics which is incorporated with said depressed portion to define an enclosed chamber at a position above the maximum level of fuel in the fuel tank;
first means for providing a fluid communication between an upper portion of said enclosed chamber and an upper portion of said vapor chamber; and
second means for providing a fluid communication between a lower portion of said enclosed chamber and a lower portion of said vapor chamber.

4,714,172

VAPOR RECOVERY SYSTEMS

John M. Morris, Auburn, Wash., assignor to GT Development Corporation, Tukwila, Wash.

Filed Dec. 23, 1986, Ser. No. 946,426
Int. Cl.[4] B01D *53/04*
U.S. Cl. 220—86 R **31 Claims**



1. A refueling vapor recovery system, comprising:
a liquid fuel tank including a fill tube having an inlet into which a liquid fuel fill nozzle is inserted for introduction of liquid fuel into said fuel tank, and a removable closure cap for said fill tube;
a vapor storage means;
a vapor recovery passageway extending from the fuel tank to the vapor storage means;
a signal pressure region in said fill tube which is at an elevated first pressure when the closure cap is installed on the fill tube and there is vapor pressure within the fuel tank, and which is at a second lower pressure when the closure cap is removed and liquid fuel is being introduced into the fill tube;
vapor valve means within said vapor recovery passageway; and
control means for said vapor valve means functioning to close said vapor valve means in response to the signal pressure region being at said first pressure, and to open the vapor valve means in response to the signal pressure region being at said second pressure, and
wherein liquid fuel being introduced into the fuel tank when the vapor valve means is open displaces vapor out from said fuel tank through the vapor recovery passageway to the vapor storage means.

4,714,173

LEAK-PROOF CLOSURES

Guillermo E. Ruiz, 800 W. 35 St., Hialeah, Fla. 33012

Filed May 12, 1986, Ser. No. 861,893
Int. Cl.[4] A47G *21/18*
U.S. Cl. 220—90.4 **7 Claims**

1. A closure for openings in containers for liquids that are withdrawn with a straw, comprising:
A. cover means tightly engaged to the rims of said openings including an orifice connecting the inside of said container to the outside and further including a tubular extension member mounted to the periphery of said orifice and having a diameter that allows a leak-proof fit of said straw;

B. one-way valve means mounted to said cover means so arranged and constructed that air is allowed in from the

outside and said liquid is not allowed to come out regardless of the position of said container; and

C. anchorage means for holding the end of said straw bent.

4,714,174

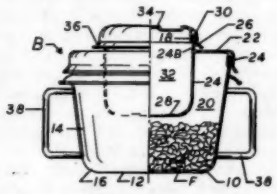
SPILL PROOF CONTAINER

James A. Williams, No. 9 Terraza Del Oeste, Harvey, La. 70058

Filed Sep. 23, 1986, Ser. No. 910,504

Int. Cl.[4] B65D *51/18; A47G 19/32, 23/06*

U.S. Cl. 220—90.4 **12 Claims**



1. A "spill-proof" bowl for eating at least somewhat dry, granular foodstuff by hand, comprising:

a container base having a peripheral wall attached around its periphery and extending upwardly from said base for forming a container having a hollow interior therein between the interior surfaces of said wall and said base, said container including a relatively large, open end opposite its base for access to said hollow interior;

a cover located on the relatively large, open end of said container for substantially closing off said hollow interior; and

a tubular portion located in a relatively small opening in said cover and positioned above said base, said relatively small opening having a lateral dimension substantially equal to the lateral dimension of the human hand of the size for which it was designed, said tubular portion including

a lower portion extending downwardly from said relatively small opening a distance below said cover and having a relatively small, lower, open end at its lower end separated up from said base for forming an open closure means spaced in said hollow interior below the midpoint between said cover and said base for providing visual and selective access to said hollow interior when open, and

an upper portion attached to said lower portion and extending upwardly from said relatively small, open end of said lower portion to terminate in an open, upper end extended and spaced above said cover and said container base having a diameter at least equal to the diameter of said relatively small, open end for access to a tubular passage having a diameter at least equal to the diameter of said relatively small, open end depending downwardly through said tubular portion to communicate with said hollow interior of said container by means of said open closure means; said tubular portion isolating a foodstuff contained between the interior surfaces of said wall and the exterior of said tubular portion away from said relatively small opening when the bowl is tipped over but allowing free access to the foodstuff in the hollow interior by the user's hand without any otherwise un-necessary open area into said interior, "spill proofing" the bowl, said lower end further having an annular portion surrounding the periphery of said relatively small, open end which curves radially inward to form an inwardly directed lip for further ioslating the foodstuff contained in said hollow interior from entering said relatively small, open end when the "spill-proof" bowl is tipped over, said annular portion having an opening suitable for access to the foodstuff by the human hand and providing an inwardly directed lip which radially widens outward to the diameter of said tubular passage for restraining entry into the tubular passage when the "spill-proof" bowl is tipped over; and

closing means spaced above said upper, open end and removably located on said open, upper end for closing off said open closure means and egress and access to the dry, granular foodstuff located in said hollow interior of said container by means of said tubular passage and said open closure means.

4,714,175

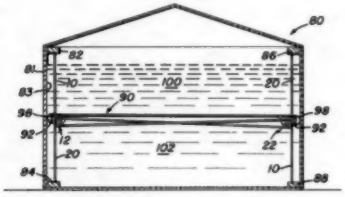
TANK LIQUID INTERFACE SEPARATION DECK WITH LEVELING LINES

Don H. Coers, Naperville, Ill., assignor to CBI Industries, Inc., Plainfield, Ill.

Filed Dec. 1, 1986, Ser. No. 936,588

Int. Cl.[4] B65D *1/24*

U.S. Cl. 220—216 **6 Claims**



1. In combination:

a liquid storage tank having vertical walls said walls comprising an interior surface;

a vertically movable deck inside said tank and having a center and an outer periphery that substantially conforms to said interior surface of said tank vertical walls in horizontal section;

said deck outer periphery spaced inwardly from said interior surface of said tank vertical walls to provide a rim space;

a deck leveling means comprising complementary first and second leveling lines and first and second pulley means on said deck for receiving said lines;

said pulley means being radially spaced from the center of the deck;

said first pulley means being diametrically opposite said second pulley means;

said first leveling line being attached at one end to the upper portion of said tank above and aligned with said first pulley means;

said first leveling line being attached at the other end to the lower portion of said tank below and aligned with said second pulley means;

said first leveling line extending down from said attachment at the upper portion of said tank to underlap said first pulley means;

said first leveling line further extending from said first pulley means to overlap said second pulley means;

said first leveling line then extending down from said second pulley means to said attachment at the lower portion of said tank;

said second leveling line being attached at one end to the upper portion of said tank above and aligned with said second pulley means;

said second leveling line being attached at the other end to the lower portion of said tank below and aligned with said first pulley means;

said second leveling line extending down from said attachment at the upper portion of said tank to underlap said second pulley means;

said second leveling line further extending from said second pulley means to overlap said first pulley means; and

said second leveling line then extending down from said first pulley means to said attachment at the lower portion of said tank.

4,714,176

LIQUID SUPPLY RESERVOIR

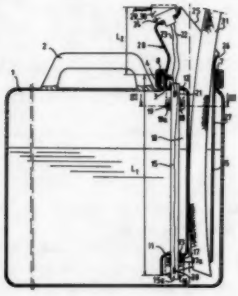
Peter J. A. Wijnen, AP Horst, Netherlands, assignor to Oce-Nederland B.V., Venlo, Netherlands

Continuation of Ser. No. 815,567, Jan. 2, 1986. This application May 11, 1987, Ser. No. 49,011

Claims priority, application Netherlands, Jan. 24, 1985, 8500188

Int. Cl.[4] B67D *5/22*

U.S. Cl. 222—51 **5 Claims**



1. In a liquid-supply reservoir of a liquid-using machine having a closable opening at the top of the reservoir in which are detachably secured both a pipe extending to near the base of the reservoir and a liquid-level sensing device forming a unit with the pipe, which pipe has an open end outside the reservoir through which a flexible conduit having one end connected to the liquid-using machine can be passed such that the other end is close to the base of the reservoir, the improvement wherein a part of the pipe has a recess formed on one side of an outside wall of the pipe, the liquid-level sensing device comprises a sensor secured to the outside wall of the pipe near a termination of the recess such that the sensor within the recess fits completely therein and every part of the pipe and sensor unit fits in the closeable opening with a slight amount of play.

4,714,177

DEVICE FOR THE METERING OF A CHEMICAL, PARTICULARLY FOR SEED TREATMENT

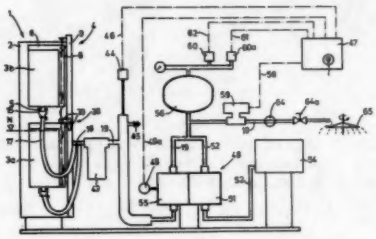
David B. Morris; Andrew C. Rollett, and Donald M. Roberts, all of Bury St. Edmunds, United Kingdom, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 7, 1986, Ser. No. 882,667

Claims priority, application United Kingdom, Jul. 26, 1985, 8518943

Int. Cl.[4] B67D *5/00*

U.S. Cl. 222—58 **11 Claims**



1. In a device for the metering of a liquid chemical, particularly for seed treating, having a reservoir for the chemical connected by a supply line to an atomiser via a metering unit and an actuating valve, the improvement comprising: a storage system unit which has a section for the reservoir in the form of a plurality of dispenser packs each having outlets facing downwards and each outlet connected by a coupling to a manifold in the supply line, means automatically tightly closing the couplings when they are decoupled and a hoist mechanism for the packs which allows each pack to be emptied separately and sequentially, the pack currently to be emptied travelling upwards by means of the hoist mechanism at such a speed that, during the emptying process, the height of the liquid level in that pack, referred to an arbitrary reference point of the fixed part of the metering unit, remains substantially constant and in which arrangement the entire liquid-containing system from the reservoir to the atomiser is closed off with respect to the environment, wherein the hoist mechanism further comprises, at each pack location, mechanical sequencing latches and pairs of first and second higher latches, the mechanical sequencing latches initially holding the packs in a lower position and releasing a first pack automatically following loading of a set of packs, the first higher latch restraining a pack at a final emptying position, the second higher latch on contact by the respective pack releasing the first higher latch associated with the immediately preceding pack location to release the pack in that location for further upwards movement and, the mechanical sequencing latches, allowing release of successive packs, on movement of the preceeding pack to the final emptying position.

4,714,178

COLLAPSIBLE STORAGE AND DISPENSING VESSEL

Aleck Bohl, Denver; John Meyers, Broomfield, and Leandro Valdez, Littleton, all of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed Feb. 24, 1987, Ser. No. 18,877

Int. Cl.[4] B65D *35/16, 81/02*

U.S. Cl. 222—107 **11 Claims**

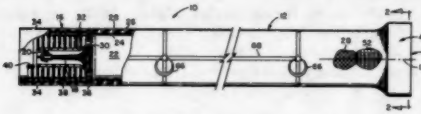
1. A collapsible fluid storage vessel comprising:

a generally cylindrical body formed of elastomer in which is embedded a reinforcement material;

an outlet attached to the body portion and in communication with the interior of the vessel;

a flattened ramp end portion extending from the body and formed by pinching together an end of the cylindrical body; and

an insert formed of reinforced elastomer bridging and bonded to juxtaposed interior sidewall portions of the cylindrical body at an end thereof adjacent said flattened



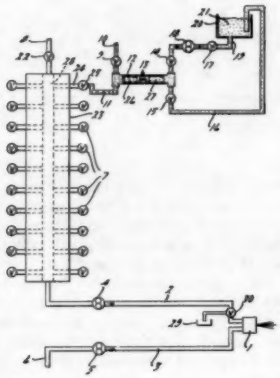
ramp portion, adapted and arranged to inhibit separation of the flattened ramp end portion upon pressurization of the storage vessel.

4,714,179

POSITIVE DISPLACEMENT PAINT PUSHOUT APPARATUS

Charles H. Otterstetter, Southgate; Duane C. Schowiak, Novi, and Paul Stueckle, Livonia, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Mar. 15, 1985, Ser. No. 711,882
Int. Cl.⁴ B05B *12/14*
U.S. Cl. 222—148 **8 Claims**



1. An apparatus for dispensing a measured amount of solvent at a precisely controlled flow rate into a painting apparatus, which comprises:

(A) a chamber separated into variable volume first and second compartments by separating means which is free to move within said chamber so as to vary the volume of said first and second compartments;

(B) means for dispensing solvent into said first compartment;

(C) means for dispensing said solvent from said first compartment into said painting apparatus;

(D) metering means comprising a motor driven, positive displacement gear pump for dispensing viscous fluid at said precisely controlled flow rate into said second compartment; and

(E) means for dispensing said viscous fluid from said second compartment,

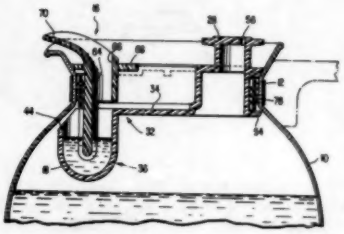
wherein during a solvent fill cycle, said solvent is dispensed into said first compartment while at the same time an equal amount of said viscous fluid is dispensed from said second compartment, and wherein during a solvent dispensing cycle, said viscous fluid is dispensed at said precisely controlled flow rate into said second compartment while at the same time an equal amount of said solvent is dispensed at said precisely controlled flow rate from said first compartment into said painting apparatus.

4,714,180

INJECTION MOLDED, SELF SEALING TOP ASSEMBLY FOR OPEN MOUTH COFFEE POTS

Wayne B. Stone, Jr., Bethesda, Md., assignor to Wood Manufacturing, Flippin, Ark.

Continuation of Ser. No. 598,767, Apr. 10, 1984, Pat. No. 4,638,929, which is a continuation-in-part of Ser. No. 532,980, Sep. 16, 1983. This application Oct. 1, 1986, Ser. No. 914,073
Int. Cl.⁴ G01F *11/26*
U.S. Cl. 222—456 **1 Claim**



1. A top assembly for an open mouth coffee pot through which coffee is introduced from the exterior of a pot to the interior thereof and subsequently dispensed from the interior of a pot externally thereof; said top assembly having liquid flow passage means extending therethrough; said flow passage means including a liquid trap for retaining a volume of coffee therein following the introduction of coffee therethrough into a coffee pot and for retaining a volume of coffee therein following the dispensing of coffee therethrough from a coffee pot; said top assembly including two parts, said parts mechanically interfitting to define said liquid trap; said top assembly having a first cylindrical surface and a second cylindrical surface below said first cylindrical surface; said second cylindrical surface having a diameter less than the diameter of said first cylindrical surface; said first cylindrical surface including first seal means for sealing the top assembly against the open mouth of a coffee pot; said second cylindrical surface including second seal means for sealing the top assembly against the open mouth of a coffee pot; said first and second seal meals selectively operational so that only one of said sealing means is in sealing relationship with the open mouth of a coffee pot, thus being able to seal said top assembly with respect to the open mouth of either of two different size open mouth coffee pots; and restricted vent means opening on opposite sides of said seal means.

4,714,181

CONDIMENT BOTTLE CAP

Thomas A. Kozlowski, Brunswick; Robert O. Lindstrom, Bay Village; Thomas D. Loughrin, Medina, and Kathleen J. Baka, Lakewood, all of Ohio, assignors to Durkee Industrial Foods Corp., Cleveland, Ohio

Filed Aug. 21, 1986, Ser. No. 898,618
Int. Cl.⁴ B67D *3/00*
U.S. Cl. 222—480 **8 Claims**

1. A molded, plastic cap, suitable for large condiment bottles, of the type adapted to be threaded onto the mouth of the bottle and to contain an inner sealing liner compressed by the cap against the bottle mouth rim, comprising

a circular end having an inside surface and an exposed topside surface;

an annular skirt depending from said end having inner threads;

a reinforcing bridge portion extending across said cap end from one side to the other;

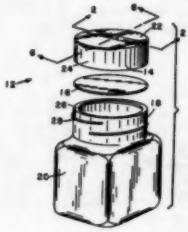
aperture means on opposite sides of said bridge portion;

lid means adapted to close said aperture means;

said end inside surface defining a flat, circular land portion

contiguous with the skirt and having a width dimension effective to press seal the sealing liner against the bottle mouth rim;

said bridge portion including longitudinally extending rib means forming a longitudinally extending reduced thick-



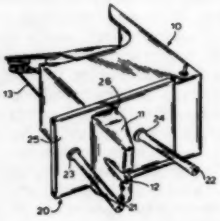
ness center part, said rib means being effectively flush on the inside surface with the land portion to resist distortion of the inner sealing liner and extending upwardly from said topside surface, the lid means being hinged to said longitudinally extending rib means.

4,714,182

METHOD AND APPARATUS FOR MAKING BOWS

David Hecht, 14 E. 90th St., New York, N.Y. 10128

Filed Jan. 28, 1987, Ser. No. 7,771
Int. Cl.[4] A41H *43/00*; D04D *7/10*
U.S. Cl. 223—46 **8 Claims**



1. An apparatus for making bows from ribbon comprising:

wrapping means for wrapping a tie around a plurality of layers of ribbon,

said wrapping means including a head having a ribbon receiving slot therein,

said head being operable to apply and wrap the tie around the plurality of layers of ribbon in response to movement of the ribbon to a predetermined point in said slot,

and positioning means mounted on the head of said wrapping means,

said positioning means comprising respective ribbon receiving members on each side of said head for receiving layers of ribbon thereon,

first portions of said positioning means being spaced further from each other than second portions thereof, said second portions being positioned adjacent said predetermined point,

whereby movement of the ribbon along said positioning means to said predetermined point produces a slack in the layers of ribbon.

8. A method of making a bow comprising the steps of:

wrapping a ribbon around second portions of two rods each of which have first portions spaced closer to each other than second portions thereof while simultaneously positioning a central portion of the wrapped ribbon in alignment with a slot in a head of an automatic tie member wrapping and twisting apparatus;

moving the central portion of the wrapped ribbon onto the first portion of each rod and into the slot to cause a slack to develop in the central portion of the ribbon and to cause operation of the apparatus whereby a tie is wrapped around the ribbon and the free ends thereof twisted to maintain the same in place; and

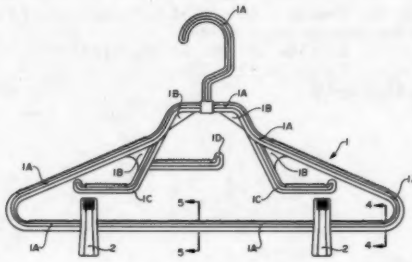
removing said ribbon from said rods and spreading apart the superimposed layers of the ribbon to form the bow.

4,714,183

PLASTIC HANGER WITH A GROOVED CIRCULAR CROSS-SECTION

Sergio Tontarelli, Via Giolitti 62-San Rocchetto, Castelfidardo, Italy

Filed Nov. 21, 1986, Ser. No. 933,111
Int. Cl.[4] A47G *25/28*
U.S. Cl. 223—91 **6 Claims**



1. A unitary integrally-molded plastic hanger intended for multiple usage, comprising a molded plastic frame, the frame having two substantially identical and diametrically opposed side channels formed therein, the channels being substantially "V"-shaped and running along the entire frame, the frame including a lower horizontal cross bar having a substantially circular cross-section provided with said side channels formed therein, thereby defining an upper arc and a lower arc intermediately of the channels, and the upper arc being formed on a radius which is larger than the radius forming the lower arc.

4,714,184

CAMERA CARRIER

Leon Young, Pacific Palisades, Calif., and Edward J. Klassen, deceased, late of Pacific Palisades, Calif. by Amelia K. Klassen, legal representative, assignors to Fotima International Ltd., Los Angeles, Calif.

Filed Mar. 13, 1987, Ser. No. 25,356
Int. Cl.[4] A45F *5/00*
U.S. Cl. 224—253 **16 Claims**

1. A camera carrier for use in supporting and carrying a camera from a person's belt, said camera carrier comprising:

a frame having a slot formed therethrough for reception of the belt of a person carrying the camera, said slot permitting mounting of said frame onto the belt;

a support plate extending outwardly from said frame when said frame is mounted at the belt of a person carrying the camera;

a carrier plate having a size and shape for seated support upon said support plate;

means for connecting said carrier plate to the camera;

a spring reel assembly mounted on said frame; and

a flexible tether line connected between said spring reel assembly and said carrier plate, said spring reel assembly applying a spring force to said tether line for normally winding said tether line into said spring reel assembly when said carrier plate is seated upon said support plate,

said spring reel assembly permitting extension of said tether line upon manual removal of said carrier plate from

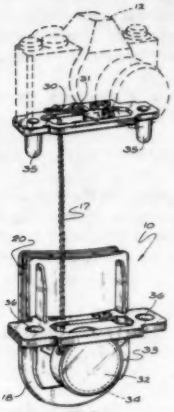


FIG. 3

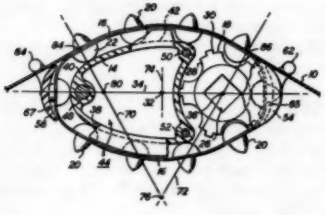
said support plate to permit normal photographic use of the camera without disconnecting the camera from said carrier plate.

4,714,185

PERFORATED WEB FEEDING APPARATUS

Leo J. Hubbard, Rio Grande, P.R., and Leo J. Kerivan, Somerset, Mass., assignors to Precision Handling Devices, Inc., Fall River, Mass.

Filed Aug. 7, 1985, Ser. No. 763,155
Int. Cl.[4] G03B 1/22
U.S. Cl. 226—74 **30 Claims**



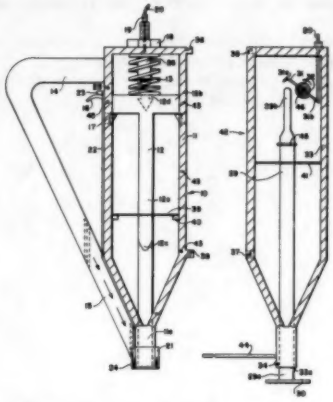
1. Apparatus for feeding perforated webs having perforations spaced from each other, which apparatus comprises an endless belt having pins spaced from each other at a pitch equal to the spacing of said perforations and engageble with said web in said perforations, said belt also having drive elements, a frame defining an elliptical path for said belt with opposite major curved surfaces about major radii, along one of which major surfaces a number of said pins engage said perforations, a sprocket journaled in said frame and engageable with said drive elements, and guide members spaced upstream and downstream of at least said one curved surface and opposed to end surfaces of said frame adjacent minor curved surfaces defined by the minor radii of said elliptical path for engaging said web and maintaining it wrapped around at least the entire extent of said one curved surface and in contact with said belt along said one curved surface.

4,714,186

FASTENER DRIVING TOOL

Reno S. Williamson, Rte. 1, Box 223, Nakina, N.C. 28455

Filed Apr. 22, 1986, Ser. No. 854,500
Int. Cl.[4] B25C 1/00, 1/02
U.S. Cl. 227—146 **20 Claims**



1. A fastener driving tool comprising:

a fastener driver housing of a size adapted to be carried by a user and having at least one open end;

hammer means reciprocative within said fastener driver housing toward and away from said open end;

bias means within said fastener driver housing for biasing said hammer means toward said open end;

trigger means on said fastener driver housing for releasably holding said hammer means in a cocked position away from said open end in opposition to said bias means;

a cocking means housing of a size adapted to be carried by said user and containing cocking means adapted to be actuated by said user's foot, said cocking means being further adapted to move said hammer means away from said open end in opposition to said bias means; and

connecting means for operably connecting said cocking means to said hammer means.

4,714,187

RELOADING UNIT FOR SURGICAL FASTENING INSTRUMENTS

David T. Green, Norwalk, Conn., assignor to United States Surgical Corporation, Norwalk, Conn.

Filed Nov. 26, 1986, Ser. No. 935,407
Int. Cl.[4] A61B 17/00
U.S. Cl. 227—19 **15 Claims**

1. A transfer magazine for providing a charge of staples to a staple cartridge in a surgical fastening instrument which comprises:

pusher means having a plurality of staple support members spaced from one another, each of said support members being generally shaped to conform to the inner surface of a staple;

a plurality of staples disposed on said staple support members, and

holding means having therein a plurality of receptacles adapted to mate with and hold each of said staples on said support members prior to transfer to the staple cartridge, said holding means being adapted to slidably move with respect to said staples and support members to release said staplers held therein and facilitate loading a charge of staples into the staple cartridge of the surgical fastening instrument.

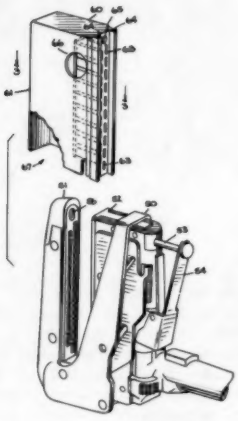
11. A method of performing multiple stapling functions utilizing a stapling instrument which comprises the steps of:

firing the instrument to expend a charge of staples contained in a staple cartridge of the instrument;

providing a new charge of staples in a transfer magazine for reloading said staple cartridge, said transfer magazine including therein a plurality of staples corresponding substantially to the number of staples carried in said staple cartridge;

opening the instrument to separate the staple cartridge and anvil portions of the stapling assembly;

positioning said transfer magazine between the open portions of said stapling assembly;



aligning said transfer magazine and staple cartridge to facilitate transfer of said staples in said magazine to said cartridge with a closed end of each of said plurality of said staples first entering said cartridge thereby aligning the free end of the legs of the staple with the opening in said cartridge; and

closing said surgical instrument sufficiently to cause said staple cartridge and anvil portions of said stapling assembly to close upon said transfer magazine disposed therebetween so as to cause transfer of the staples from said transfer magazine to said staple cartridge.

4,714,188

METHOD OF MAKING METAL SCULPTURES

Kenneth C. Flynn, Forest Woods Ct., Rte. 3, Box 139A, Hedgesville, W. Va. 25427

Filed Oct. 20, 1986, Ser. No. 920,406

Int. Cl.[4] B23K *31/00*

U.S. Cl. 228—120 **18 Claims**

16. The method of making a metallic sculpture that comprises the steps of:

(a) sculpting a core to an artistic shape from a solid capable of being changed to a fluid form;

(b) applying support elements to the core in its solid state outwardly therefrom, at selected, spaced locations occurring with a frequency sufficient to cause said elements to define a sheath support structure generally similar in shape to said core;

(c) applying a metallic material in molten form to said elements to form a sheet-like sheath about the core which will include both said metallic material and said elements, and will be of a shape generally duplicating that of the core; and

(d) thereafter changing the form of the core from its solid to its fluid state so as to remove the core and leave said sheath as a finished metallic sculpture comprised wholly of said metallic material and said support elements.

4,714,189

BRAZING EUTECTIC AND METHOD

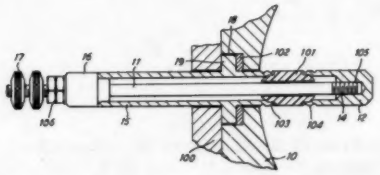
Stuart J. Tovey, Aldershot, England, assignor to Schlumberger Electronics (U.K.) Limited, Farnborough, England

Filed Mar. 26, 1986, Ser. No. 844,427

Claims priority, application United Kingdom, Mar. 27, 1985, 8507909

Int. Cl.[4] H01B *17/30*; B23K *1/04*

U.S. Cl. 228—122 **7 Claims**



1. A method of brazing a ceramic component to another component, including the steps of:

forming a ceramic component to be brazed in a ceramic of average gain size of substantially between 5 and 15 microns and of purity exceeding 99% with a maximum silica content of substantially 0.2%,

introducing between components a eutectic of substantially the composition:

80% to 90% silver

5% to 6% copper

less than 6% titantium,

and sufficient in quantity to fill gap therebetween, and

subjecting the components to a temperature in excess of eutectic liquidus temperature whilst maintaining the components in a vacuum.

4,714,190

FAST FOOD TAKE OUT CARTON WITH COVER

Diane M. Morrocco, 71 Haviland St., Bristol, Conn. 06010

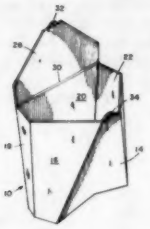
Filed Sep. 11, 1986, Ser. No. 905,955

Int. Cl.[4] B65D *5/34*

U.S. Cl. 229—1.5 B **7 Claims**

1. A scoop-type carton for fast food items, said carton being of thermally insulating material and comprising a body portion including a bottom and side panels upstanding from said bottom, a cover and an integral hinge connecting said cover and one of said side panels at said open end, said cover conforming in size and shape to said open end, said cover being movable between an open position in which items can be scooped into said body portion and said cover extends longitudinally from said panel to which it is connected by said hinge and a closed position in which it is folded down to cover said open end, said

hinge being biased to hold said cover normally longitudinally extending from said one of said side panels in said open posi-



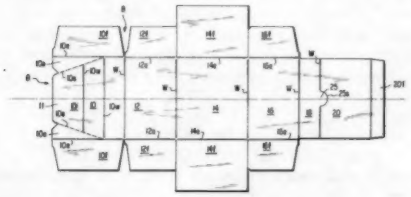
tion, and having a built-in bias tending to maintain said cover in, or return it to, said open position.

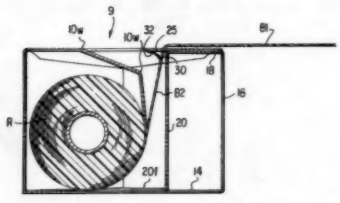
4,714,191

DISPENSING CARTON FOR PLASTIC BAGS

Paul D. Richardson, Cincinnati, Ohio, assignor to International Paper Company, Purchase, N.Y.

Filed Mar. 11, 1987, Ser. No. 24,428
Int. Cl.[4] B65D *85/67*
U.S. Cl. 229—121 **14 Claims**





1. A one piece paperboard blank for a carton to contain plastic bags in a roll and from which to dispense such bags individually, said blank comprising:

(a) top (**10**), back (**12**), bottom (**14**), front (**16**), inner top (**18**) and inner front (**20**) panels in the order named from one end of the blank to the other and foldable with respect to each other;

(b) said top panel having score lines (**10***s*) along which its inner part (**10***f*) may be severed from its outer parts (**10***o*);

(c) at least one of said top, back, bottom, and front panels having a pair of side flaps (**10***f*, **12***f*, **14***f*, **16***f*) foldably attached along its side edges (**10***e*, **12***e*, **14***e*, **16***e*); and

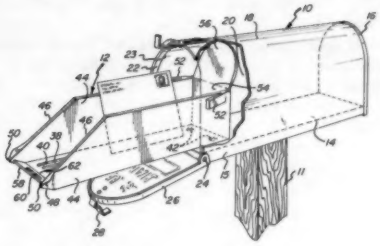
(d) said inner top panel having a tab (**25**) defined by a slit (**25***s*) in the inner front panel, said tab being arranged to be disposed generally in the plane of the surface of the inner top panel in the erected carton.

4,714,192

SLIDABLE TRAY INSERT FOR MAILBOXES

Albert L. Harlow, Jr., Norwalk, and Arthur M. Feiske, Westport, both of Conn., assignors to EZ Mail Corporation, Bridgeport, Conn.

Continuation of Ser. No. 702,060, Feb. 15, 1985, Pat. No. 4,600,143. This application Jul. 10, 1986, Ser. No. 883,928
The portion of the term of this patent subsequent to Jul. 15, 2003, has been disclaimed.
Int. Cl.[4] B65P *91/00*
U.S. Cl. 232—17 **18 Claims**



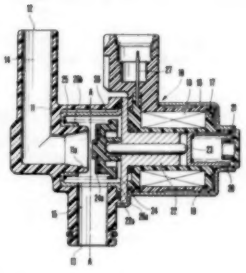
1. A slidable tray insert for use in combination with a rural mailbox having a bottom panel, a back panel and a U-shaped roof portion defining an enclosure with an entrance opening at one end thereof, and a door member pivotally mounted adjacent said entrance opening for movement between an open position permitting access to the enclosure through the entrance opening and a closed position covering the entrance opening, comprising: a generally rectangular bottom wall, a pair of side walls extending upwardly from said bottom wall, an end wall extending upwardly from said bottom wall and transversely between said side walls, and a handle disposed on said bottom wall spaced from said side walls, said handle being connected to the bottom wall by hinge means permitting pivoting movement of said handle between an upwardly inclined position and a position flush with said bottom wall.

4,714,193

SELECTOR VALVE DEVICE

Kenji Yogo, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Nov. 6, 1986, Ser. No. 927,582
Claims priority, application Japan, Nov. 6, 1985, 60-248439
Int. Cl.[4] F02M *1/10*
U.S. Cl. 236—75 **3 Claims**



1. In a selector valve device comprising; a body having an inlet port and an outlet port, a fluid passageway communicating with said inlet port and outlet port, a valve to open and close said fluid passageway, an outer periphery yoke made of magnetic material and fixed to said body, an inner core dis-

posed on the axis of said outer yoke, a bobbin made of non-magnetic material and fixed to the outer periphery of said inner core, a solenoid coil wound on said bobbin and forming a magnetic circuit with said outer periphery yoke and inner core, a plunger disposed in said magnetic circuit and attracted by said inner core when said solenoid coil energized, a shaft for connecting said plunger with said valve at the operation time, a first spring biasing said valve to its closed position through said shaft, and a second spring biasing said valve to an opened position resisting the biasing force of said first spring, said second spring being made of shape-memory alloy so as to expand to a memorized shape at high temperature, an improvement wherein:

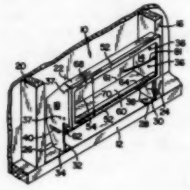
a metal heat transfer member is disposed between said inner core and said body, a first end of said metal heat transfer member being formed as a flange portion and closely contacted to the flange portion of said inner core, and a second end of said metal heat transfer member being contacted to one end of said second spring.

4,714,194

HOUSING FOR WALL MOUNTED HEATING UNIT

Harold J. Eckman, Milwaukie, Oreg., assignor to Cadet Manufacturing Company, Vancouver, Wash.

Filed Jul. 11, 1985, Ser. No. 754,366
Int. Cl.[4] F24H *9/02*; F24D *19/06*
U.S. Cl. 237—70 **14 Claims**



1. A sheet metal housing for a heating unit, suitable for mounting within a building wall of frame construction including generally vertical members separated from one another within said building wall by a standard spacing, the housing comprising:

(a) a body including an upright back wall;

(b) a bottom member extending generally forward from said back wall;

(c) a pair of opposite upright end walls extending generally forward from said back wall, said end walls defining a body length which is less than said standard spacing;

(d) a respective leg extending downwardly beneath said bottom member as an extension of each of said end walls, each said leg including a bottom end; and

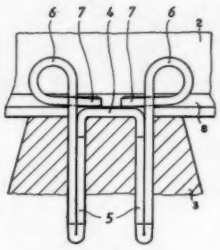
(e) means associated with at least one said leg for defining at least one bend line thereon, said at least one bend line defining a spacer distance extending along the respective leg a distance equal to the difference between said body length and said standard spacing, so that when said respective leg is bent along said bend line, and a portion of said leg is thereby placed in a horizontal position, said body length and said portion together extend over a distance equal to said standard spacing.

4,714,195

TRACK SPIKE WITH A SINGLE OR DOUBLE SHAFT

Walter Creutz, Dortmund; Peter Dahlhaus, Radevormwald, and Heinz Hofmann, Dortmund, all of Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 10, 1985, Ser. No. 774,539
Claims priority, application Fed. Rep. of Germany, Oct. 16, 1984, 3437839
Int. Cl.[4] E01B *9/08*
U.S. Cl. 238—349 **2 Claims**



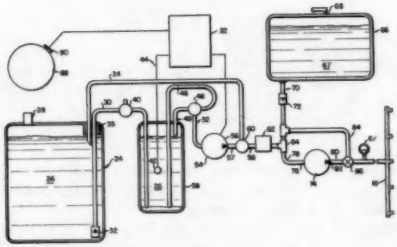
1. A track spike for wood ties having resiliently spaced double shaft portions each with a spring loop and a crosspiece therebetween, each double shaft portion being over relative to a corresponding bore in a wood tie, characterized in that the crosspiece carrying shaft portions are offset resiliently over at most one quarter of their length via a bend of the upper part thereof in a direction toward the corresponding rail foot, the crosspiece thus being maintained in pressure engagement with the corresponding rail foot despite squeezing of the shaft portions together during insertion into their respective bores.

4,714,196

FARM CHEMICAL DELIVERY SYSTEM

Richard D. McEachern, Carrollton; Willie W. Jordan, Garland; Gerald C. Gebheim, Arlington, and Joe M. Robinson, Childress, all of Tex., assignors to AgRobotics, Inc., Childress, Tex.

Continuation of Ser. No. 680,604, Dec. 11, 1984, abandoned. This application Aug. 8, 1986, Ser. No. 894,719
Int. Cl.[4] B05B *7/00*
U.S. Cl. 239—62 **6 Claims**



1. A chemical metering system for delivering chemicals to a spray apparatus for dispensing chemical spray from a moving vehicle, said metering apparatus delivering said chemicals at a constant preselected application rate, the spray apparatus having a main fluid pump pumping carrier fluid from a carrier fluid supply along a carrier fluid flow path to a nozzle system, the chemical metering system comprising:

at least one chemical supply tank;

at least one positive displacement chemical metering pump communicating with said supply tank for continuously

delivering chemicals from the chemical supply tank to the carrier fluid flow path upstream of the nozzle system;

a ground speed sensing means for measuring vehicle ground speed;

a control module which includes motor control circuit to vary the speed of the chemical metering pump responsive to the vehicle speed sensed by the vehicle ground speed sensing means, and responsive to the operator inputs for the width of spray swath and the rate of chemicals to be dispensed per unit area of the terrain to maintain the preselected application rate;

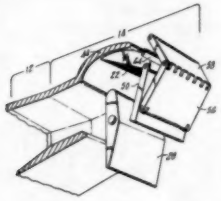
said control module controlling the speed of the chemical metering pump in response to the width of spray swath and the speed sensing means generating a voltage signal related to ground speed, the control module having at least one range switch means for setting the width of spray swath, said range switch means being connected to a first resistance means for modifying the voltage signal from the speed sensing means transmitted to the chemical metering pump, said control module further having a concentration selector assembly for operator selection of the desired rate of chemical to be delivered to the ground, the concentration selector assembly having a second resistance means for further modifying the voltage signal from the ground speed sensing means in response to the selection of the desired rate, the control module and speed sensing means controlling the rotation of the chemical metering pump to permit the desired rate of chemical to be delivered to the ground independent of vehicle speed and carrier fluid flow, the range switch means for setting the width of spray swath permitting the chemical delivery system to be used with diverse nozzle configurations without recalibration of the speed sensing means and concentration selector assembly.

4,714,197

2-D PROPULSIVE LIFT NOZZLE

Edward B. Thayer, Jupiter, and Eric J. Ward, West Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jul. 2, 1986, Ser. No. 881,375
Int. Cl.⁴ B64C *15/00*
U.S. Cl. 239—265.29 **7 Claims**



1. An exhaust nozzle for directing a flowing stream of gas, including an exhaust duct comprising:

two opposed, spaced apart sidewalls;

an upper flap assembly disposed between the two sidewalls; and

a lower flap assembly disposed between the two sidewalls,

the lower flap assembly, the upper flap assembly, and the two sidewalls together defining a flow path for the gas stream,

the upper flap assembly including

a dorsal flap having a fore edge and an aft edge and being pivotable about a first fixed axis disposed within the gas flow path and extending between the two sidewalls, and

a downstream flap, having a fore edge and an aft edge, the fore edge of the downstream flap being pivotally connected to the aft edge of the dorsal flap for cooperatively defining a movable exhaust gas directing barrier,

the lower flap assembly including

a ventral flap having a fore edge and an aft edge and being rotatable about a second fixed axis disposed intermediate the fore and aft edges thereof and extending between the two sidewalls;

a fixed dorsal wall, disposed between the two sidewalls and extending downstream adjacent the upper flap assembly;

means, slidably engageable between the dorsal wall and the dorsal flap, for sealing against gas leakage therebetween;

a first actuator, including a first pair of disks each disposed adjacent one of the two sidewalls, the first pair of disks cooperatively supporting the dorsal flap therebetween and being each centrally rotatable about the first fixed axis;

a linkage assembly, including

a fairing link having a first end engaged with the aft end of the downstream flap, and a second end;

a connecting link, having a first end engaged with the fairing link second end, and a second end engaged with the dorsal flap; and

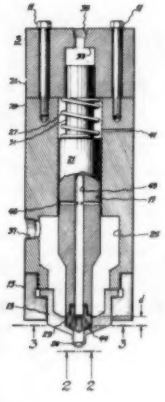
a thrust link, having a first end connected to a second actuator and a second end engaged with either the connecting link or the fairing link for selectably positioning the downstream flap.

4,714,198

DUAL FUEL SINGLE INJECTOR NOZZLE

Sudhir D. Savkar, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 3, 1986, Ser. No. 937,246
Int. Cl.⁴ B05B *7/12*
U.S. Cl. 239—409 **5 Claims**



1. A dual fuel nozzle comprising:

a housing defining an interior bore, a first and second chamber, a coal/water slurry inlet port and a pilot fuel inlet port, said first chamber in flow communication with the coal/water slurry inlet port and the second chamber in flow communication with the pilot fuel inlet port.

said housing further including a nozzle cup, said nozzle cup defining a plurality of apertures extending from the interior of the nozzle cup to the exterior of the nozzle cup, said nozzle cup in flow communication with said first and second chambers;

bias means; and

a plunger slidably mounted in said bore, a portion of said plunger passing through said first chamber, one end of said plunger defining a valve, the valve engageable with a seat defined by said housing, said bias means urging said valve towards said seat, a portion of said plunger passing through said first chamber having an increasing diameter in a direction away from the valve end, said valve capable

of three positions depending on the pressure of said slurry in said first chamber, a fully seated position preventing flow communication between said first chamber and said nozzle cup and preventing flow communication between said second chamber and said nozzle cup, a partially seated position preventing flow communication between said first chamber and said nozzle cup and permitting flow communication between said second chamber and said nozzle cup thereby allowing pilot fuel to flow and purge said seat of slurry, and a fully open position permitting flow communication between said first chamber and the nozzle cup and said second chamber and said nozzle cup, thereby allowing slurry fuel and pilot fuel to flow.

4,714,199

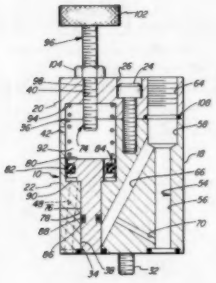
LIQUID ATOMIZING NOZZLE FOR SPRAY APPARATUS

Allan B. Heath, 3819 Electric Ave., and Richard G. Gossman, 2525 Wright St., both of Port Huron, Mich. 48060

Filed May 9, 1986, Ser. No. 861,548

Int. Cl.[4] F16K *27/00*

U.S. Cl. 239—412 **17 Claims**



1. An atomizing nozzle for a spray apparatus for selectively applying an atomized liquid to the working surfaces of forming apparatuses, comprising:

a housing,

a first elongated fluid passageway extending substantially linearly through said housing and having an inlet at one end and an outlet at the other end,

a second fluid passageway spaced from said first passageway and having an inlet at one end thereof wherein the longitudinal axis of said first and said second passageways are substantially parallel,

a third fluid passageway having one end opening into said first passageway intermediate the ends thereof and the other end opening into said second fluid passageway, said third passageway having a longitudinal axis which intersects the longitudinal axis of said second passageway at an acute angle whereby said intersection creates an elliptically shaped orifice within said second passageway,

valve means disposed within said second fluid passageway and movable in response to a control signal from a closed position overlying said orifice to an operative position wherein at least a portion of said orifice is uncovered such that said liquid supplied to said second passageway inlet is permitted to flow into said third passageway and become mixed with blow air introduced into said first passageway inlet such that atomized liquid is discharged from said first passageway outlet, and

valve positioning means for adjustably controlling the extent to which said orifice is uncovered when said valve means is in said operative position thereby modulating the rate of flow of said liquid into said third fluid passageway.

7. An atomizing nozzle for a spray apparatus for selectively applying an atomized liquid to the working surfaces of forming apparatuses, comprising:

a housing,

a first elongated fluid passageway extending substantially linearly through said housing and having an inlet at one end and an outlet at the other end,

a second fluid passageway spaced from said first passageway and having an inlet at one end thereof.

a third fluid passageway having one end opening into said first passageway intermediate the ends thereof and the other end opening into said second fluid passageway, thereby defining an orifice in the wall of said second fluid passageway,

valve means disposed within said second fluid passageway and movable in response to a control signal from a closed position overlying said orifice to an operative position wherein at least a portion of said orifice is uncovered such that fluid supplied to said second passageway inlet is permitted to flow into said third passageway and become mixed with blow air introduced into said first passageway inlet such that atomized liquid is discharged from said first passageway outlet,

a fourth fluid passageway having one end opening into said third passageway adjacent said orifice and intersecting said third fluid passageway at a substantially right angle and another end opening into said first passageway adjacent said inlet such that when said valve means moves to said operative position, said liquid flows into said third passageway and wherein a portion of blow air applied to said first fluid passageway inlet mixes with said liquid in said third passageway by passage through said fourth passageway to preatomize said liquid, and wherein the remainder of said blow air mixes with said preatomized liquid exiting said third passageway to thereby more completely atomize said liquid.

4,714,200

NOZZLE FOR SPRAYER

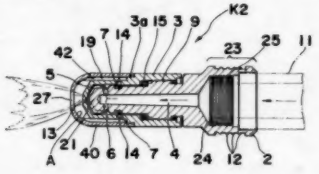
Shigeharu Sayama, Fukuoka, Japan, assignor to Kyushu Hitachi Maxell, Ltd., Fukuoka, Japan

Continuation of Ser. No. 700,288, Feb. 11, 1985, abandoned. This application Oct. 7, 1986, Ser. No. 916,364

Claims priority, application Japan, Feb. 21, 1984, 59-23483[U]; Jan. 9, 1985, 60-1190[U]

Int. Cl.[4] B05B *1/30*

U.S. Cl. 239—579 **7 Claims**



1. A nozzle device for connection with a pump means, comprising:

a nozzle body having formed therein at least one delivery hole communicating via a flow path extending axially along an axis thereof with said pump means such that liquid is fed to said at least one delivery hole by said pump means;

a sealing member fitted around said nozzle body axially rearward of said at least one delivery hole;

a cap member having front and rear portions, formed around a central axis and being axially movably mounted on said nozzle body, said cap member having a spray opening, including said central axis, formed at a front face of said front portion and a plurality of discharge openings formed through an outer periphery of said front portion, said cap member being movable in axially rearward and forward directions relative to said nozzle body to a plurality of

positions, in said plurality of positions supply of liquid from said at least one delivery hole to said discharge openings in either blocked or not blocked by said sealing member; and

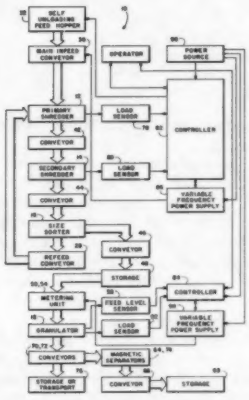
a cover member formed around said central axis and mounted on said front portion of the cap member, said cover member having an outlet hole including said central axis, said outlet hole being in alignment with and axially forward of said spray opening so as to confront and communicate with said spray opening, and a passageway for the flow of liquid from said at least one delivery hole through said plurality of discharge openings to said outlet hole defined between the inner periphery of the cover member and the outer periphery of the cap member such that said nozzle device provides three distinct modes of delivery of said liquid.

4,714,201

TIRE PROCESSING APPARATUS AND METHOD

Michael W. Rouse, West Linn; Robert L. Thelen, Woodburn, and John Morison, Gresham, all of Oreg., assignors to Waste Recovery, Inc., Portland, Oreg.

Filed Oct. 24, 1986, Ser. No. 923,110
Int. Cl.[4] B02L *23/12, 23/14*
U.S. Cl. 241—24 **8 Claims**



1. A method for reducing large pieces of tough, resilient materials such as rubber vehicle tires, some of said large pieces including magnetic reinforcing structures, into smaller pieces, comprising:

(a) shearing said large pieces of material in a primary rotary shear apparatus of the type having cooperative counter-rotating cutter rolls, thereby reducing said large pieces into primary pieces at least some of which are elongate;

(b) passing said primary pieces including said elongate pieces through a secondary rotary shear mechanism of the type including cooperative counter-rotating cutter rolls to further reduce the size of primary pieces of material and produce secondary pieces;

(c) sorting from the secondary pieces which have passed through both the primary and secondary rotary shear machines intermediate pieces which are smaller than a predetermined maximum size and secondary pieces which are larger than said predetermined maximum size;

(d) repeating steps (a), (b), and (c) with respect to said secondary pieces which are larger than said predetermined maximum size;

(e) placing said intermediate pieces which are smaller than said predetermined maximum size in a temporary storage location;

(f) removing some of said intermediate pieces from said temporary storage location at a controlled rate;

(g) granulating said intermediate pieces and reducing the size thereof in a granulator, to produce granulated materials having a predetermined smaller final granule size, at the maximum rate at which said granulator can be operated continuously;

(h) magnetically lifting loose pieces of magnetic material from among said granulated materials;

(i) thereafter moving the remaining granulated materials over a self-cleaning magnet magnetically attracting and removing additional magnetic material from said remaining granulated materials;

(j) permitting non-magnetic portions of said granulated materials to fall free from said self-cleaning magnet; and

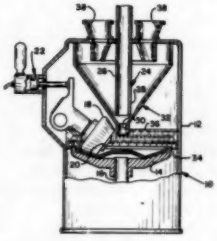
(k) thereafter conveying said non-magnetic portions of said granulated materials to a discharge location.

4,714,202

PULVERIZED SOLID CONTROL SYSTEM

George F. Shulof, Bloomfield, and Michael J. DiMonte, South Windsor, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Feb. 12, 1986, Ser. No. 828,490
Int. Cl.[4] B02C *25/00*
U.S. Cl. 241—30 **11 Claims**



1. A control system for exercising control over the fineness of the particles ground in a bowl mill comprising:

(a) first signal means for supplying signals indicating the fineness of the particles being discharged from the bowl mill;

(b) operation optimization logic means connected in circuit relation with said first signal means for receiving signals from said first signal means as an input to said operation optimization logic means, said operation optimization logic means having a pre-established bank of data stored therein relating to the grinding of particles in the bowl mill, said operation optimization logic means upon receipt of signals from said first signal means being operative to determine the nature of adjustments to be made in the grinding operation occurring in the bowl mill, said operation optimization logic means being operative to provide an output reflective of the nature of adjustments to be made in the grinding operation occurring within the bowl mill;

(c) control logic means connected in circuit relation with said operation optimization logic means for receiving said output therefrom, said control logic means having a pre-established bank of data stored therein pertaining to the control of the operation of the bowl mill, said control logic means upon receipt of said output from said operation optimization logic means being operative to determine the nature of corrections required to be made in the control of the operation of the bowl mill, said control logic means further being operative to produce a first output reflecting the nature of corrections required to be made in the control of the operation of the bowl mill; and

(d) first output means connected in circuit relation with said control logic means and with the bowl mill controls, said first output means being operative to transmit said first

output from said control logic means to the bowl mill controls.

4,714,203

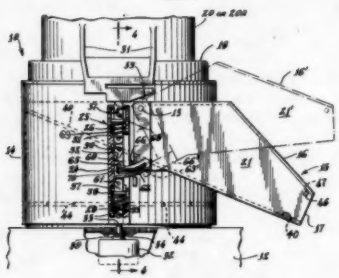
CHUTE OPERATED CONTROL FOR A FOOD PROCESSOR

James E. Williams, Stamford, Conn., assignor to Cuisinarts Research & Development, Inc., Greenwich, Conn.

Filed May 27, 1982, Ser. No. 382,718

Int. Cl.[4] B02C *23/04*

U.S. Cl. 241—36 **11 Claims**



1. In a food processor of the type including a housing having an electric motor drive, a bowl mountable on said housing for enclosing a rotary food processing tool within said bowl by said electric motor drive, removable components including a cover adapted to be secured in poisition on said bowl, a feed tube forming a passageway for feeding food items into said bowl, the improvement comprising:

a chute having a first end positioned on said bowl and a mouth adapted to direct food processed by said food processing tool out of said bowl,

a fixed inclined ramp mounted in said bowl beneath said food processing tool and extending on a downward slope toward the mouth of said chute for causing food processed by said rotary food processing tool to be deposited on said inclined ramp for sliding down said ramp into said chute for discharge from said bowl,

an openable hinged lid having a first end mounted for pivotal movement on said bowl and a second end forming a portion of the mouth of said chute, said lid normally covering said chute and being openable by swinging said second end of said lid away from said mouth, and

motor drive control means coupled to said lid for disabling said motor drive when said lid on said chute is swung open for providing access to said inclined ramp for wiping food materials off of said ramp.

4,714,204

IMPELLER-TYPE CUTTER DRUM FOR A CHOPPER

Günter John; Karl-Heinz Kretschmer, both of Neustadt, and Jürgen Röllich, Ehrenberg, all of German Democratic Rep., assignors to VEB Kombinat Fortschritt Landmaschinen, Neustadt in Sachsen, German Democratic Rep.

Continuation of Ser. No. 752,303, Jul. 3, 1985, abandoned. This application Oct. 14, 1986, Ser. No. 918,674

Claims priority, application German Democratic Rep., Jul. 4, 1984, 264915

Int. Cl.[4] B02C *18/22*

U.S. Cl. 241—55 **13 Claims**

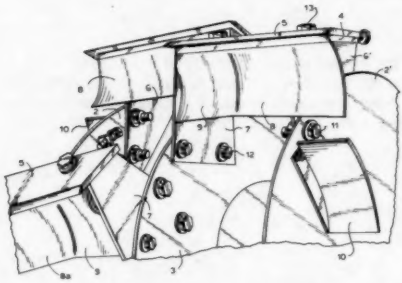
1. An impeller-type cutter drum for a chopper, the drum comprising:

a drum body centered on and rotatable in one direction about an axis, and having a center drum disk generally perpendicular to the axis and right and left outer drum disks parallel to the center disk, the center disk being between the outer disks;

respective right and left sets of holders each between its respective outer disk and the center disk, the holders being generally angularly equispaced about the disks to right and left axial sides of the center disk;

respective straight right and left blades having cutting edges, the blades being secured to the holders and each extending from respective inner ends at the center disk to respective outer ends at its respective outer disk, the blades being angled from the center disk back to the outer disks with the inner end of each blade trailing its respective outer blade end in the direction; and

respective right and left impeller vanes extending generally



parallel to and along the blades radially inward therefrom and each having

a respective generally straight inner portion at the center disk and having an inner end at the center disk and an outer end, each inner portion being angled forward in the direction from the respective inner-portion outer end to the respective inner-portion inner end and

a respective generally straight outer portion at the respective outer disk, angled forward in the direction from the respective inner-portion outer end toward the respective outer disk, mainly leading the respective inner portion in the direction, about at least three times longer than the respective inner portion, and meeting the outer end of the respective inner portion at an angled junction open forward in the direction.

4,714,205

DEVICES FOR CRUSHING, MASHING AND/OR GRINDING FOODSTUFFS

Willi Steinko, Nassau, Fed. Rep. of Germany, assignor to Mike & Kremmel Ltd., Kowloon, Hong Kong

Continuation of Ser. No. 635,386, Jul. 30, 1984, abandoned. This application Sep. 2, 1986, Ser. No. 903,873

Claims priority, application United Kingdom, Aug. 1, 1983, 8320670

Int. Cl.[4] B02C *19/08*

U.S. Cl. 241—95 **14 Claims**

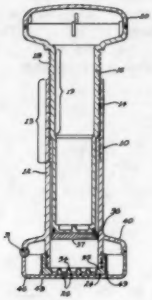
1. A device for crushing, mashing and/or grinding foodstuff, such as garlic, comprising:

a hollow cylindrical housing with an external screw thread extending from a first end thereof, and an internal screw thread adjacent a second end thereof,

a central ram of length substantially equal to the length of the housing and of cross-section substantially equal to the inner cross-section of the housing, the ram having an external screw thread along a part of its length threadingly engaging said internal screw thread on the housing such that twisting of the ram relative to the housing advances or retracts the ram in the housing,

an inner end to said ram which mates tightly with said hollow cylindrical housing,

a cup-shaped member having a perforated rigid grinding plate which covers the said first end of said housing, and a cylindrical wall portion extending from the plate, said wall portion having an internal screw thread matingly engaging said external screw thread on the housing, the cup-shaped member being removably mounted on said first end of the housing by means of said screw threads



whereby said plate mates with said first housing end to give a substantially crevice-free circular line join,

said inner end of the ram having a shape which mates closely with the inner surface of said grinding plate so that when said ram is advanced fully to said first end of said housing substantially all of the foodstuff is forced through the perforations in said grinding plate.

4,714,206

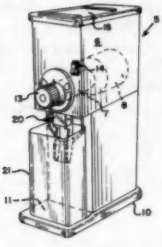
BAG-RECEIVING CHUTE FOR COFFEE GRINDER

Charles A. Nidiffer, Decatur, and Raymond E. Van Camp, Rochester, both of Ill., assignors to Bunn-O-Matic Corporation, Springfield, Ill.

Filed Apr. 1, 1986, Ser. No. 846,711

Int. Cl.[4] B02C *19/00, 23/00*

U.S. Cl. 241—100 **8 Claims**



1. A bag-receiving discharge chute combination for a coffee grinder having a downwardly facing discharge opening from which different sized batches of ground coffee are discharged into bags of correspondingly different heights, comprising,

a substantially vertical downwardly extending elongated, channel-shaped chute body adapted to be attached at its upper end to an overhanging portion of the coffee grinder so that ground coffee discharges into the upper end of the chute, the open side of said chute faces away from the grinder, and the back side of said chute is spaced from the grinder; and,

a bag mouth spreader mounted on said chute body so as to prevent a bag mouth from being held with respect to said chute body so as to prevent free discharge of ground coffee therefrom.

4,714,207

IMPACT BAR FOR A COMMINUTING ROTOR

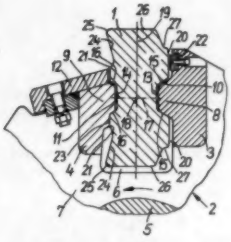
Hermann Schrödl, Gallspach, Austria, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Jul. 17, 1986, Ser. No. 886,441

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525442

Int. Cl.[4] B02C *13/28*

U.S. Cl. 241—189 R **18 Claims**



1. In an impact bar adapted to assume an installed state in a rotor of a comminuting machine; the rotor having a rotary axis, a plane of rotation and a direction of rotation; the impact bar having a length extending generally radially as viewed relative to said rotary axis in said installed state, a leading side and a trailing side as viewed relative to said direction of rotation in said installed state, and a cross-sectional area taken along a sectional plane extending parallel to said plane of rotation as viewed in said installed state; said cross-sectional area being curved in a generally C shape open towards said leading side and being symmetrically relative to a symmetry plane being generally perpendicular to said length; said cross-sectional area having a constriction lying in said symmetry plane; said trailing side being adapted to be supported against tangential forces at a location situated radially outwardly of said constriction as viewed relative to said rotary axis in said installed state; the improvement wherein said constriction is formed by a first and a second groove at said leading side and said trailing side; each groove being cross-sectionally symmetrical to said symmetry plane and each having a groove bottom and lateral groove flanks constituting holding faces for taking up forces oriented generally radially as viewed relative to said rotary axis in said installed state.

4,714,208

MAGNETIC BRAKE CONTROL FOR FISHING REEL

Joseph M. Holahan, and J. Myles Holahan, both of Anderson, S.C., assignors to Ryobi American Corporation, Bensenville, Ill.

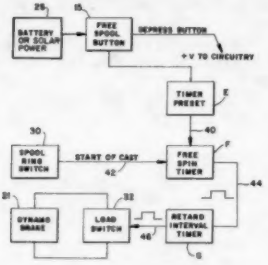
Filed Sep. 16, 1985, Ser. No. 776,488

Int. Cl.[4] A01K *89/02*

U.S. Cl. 242—84.52 B **12 Claims**

1. A fishing reel comprising a frame, a revolving spool mounted on a spool shaft connecting end members of the frame of the reel, a rotor mounted on the spool shaft, conductors carried by the rotor, a dynamo brake positioned adjacent to one of said end members of the frame, an electronic control means and timing means for controlling said brake, a source of direct electrical current, switch means, an actuator adapted to

actuate said switch means to close the electrical circuit to active said electronic control means and timing means for braking of the spool for a selected time and to open said switch to release the spool from braking for a selected time.



4,714,209

COIL FORMING METHOD

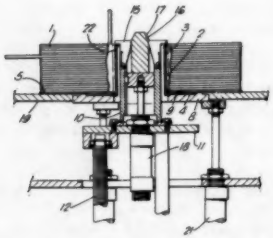
Vincent L. Allard, Staines, England, assignor to BICC Public Limited Company, London, England

Continuation of Ser. No. 746,182, Jun. 18, 1985, abandoned. This application Oct. 20, 1986, Ser. No. 921,734

Claims priority, application United Kingdom, Jun. 20, 1984, 8415734

Int. Cl.[4] B65H *54/00, 67/00;* **B21C** *47/02*

U.S. Cl. 242—25 R **11 Claims**



6. In combination, a spool and an apparatus for separating a coil of cable from the spool, the spool of said combination comprising:

a removable flange having an aperture extending therethrough;

an elongated spool barrel of generally constant outer cross section along its length, said cross section being dimensioned to enable said spool barrel to pass through said aperture in said removable flange; and the apparatus of said combination comprising;

means for selectively effecting relative movement between said removable flange and said spool barrel such that in a first relative position said spool barrel extends through said aperture and from said removable flange, and such that in a second relative position, said spool barrel is substantially free of said coil and substantially spaced from said removable flange.

11. A method of forming a coil of cable comprising the steps of: providing a spool comprising a longitudinally extending barrel and a spool flange fixedly connected to one end of the barrier; providing a removable flange having an aperture extending therethrough dimensioned to receive the spool barrel; moving the spool barrel through the aperture in the removable flange, such that the removable flange is generally adjacent the spool flauge; winding a predetermined length of cable around the spool barrel and on the removable flange; and separating the spool from the wound cable and the removable flange to leave the wound cable on the removable flange.

4,714,210

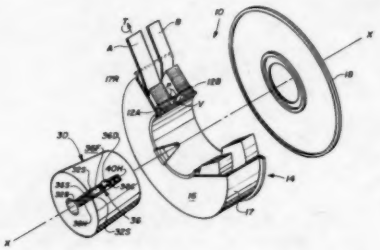
DISPENSING APPARATUS

Gary W. Howell, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 23, 1986, Ser. No. 877,616

Int. Cl.[4] B65H *16/02, 23/08*

U.S. Cl. 242—55.3 **5 Claims**



1. Apparatus for dispensing a strip of material mounted on each one of a pair of separate spools, the apparatus comprising:

a hub having an axial dimension sized to receive both of the spools in spaced axial adjacency, the hub having an axially extending slot therein, the slot being arranged in the hub so as to expose a portion of a selected one but not the other of the spools receivable thereon;

a spindle insertable into the hub, the spindle having a bore and a groove formed therein, the groove being defined by a pair of sidewalls and a base;

a rotation retarding member mounted within the groove in the spindle and projectable through the slot in the hub to abut the selected spool in a friction generating relationship so as to inhibit the rotation of the selected spool with respect to the hub, a portion of the member abutting against a sidewall of the groove and arranged so that any torque imposed on the member by rotation of the selected spool is transmitted to the spindle; and

a biasing spring disposed in the bore, the spring biasing the member into the friction generating relationship with the spool.

4,714,211

PACKING FILM DISPENSER

Harrison Hwang, No. 23, Lin Tsuo Road, Shenkang, Taichung Hsien, Taiwan

Filed Jul. 15, 1986, Ser. No. 885,770

Int. Cl.[4] B65H *23/06;* **B44C** *7/00*

U.S. Cl. 242—96 **9 Claims**

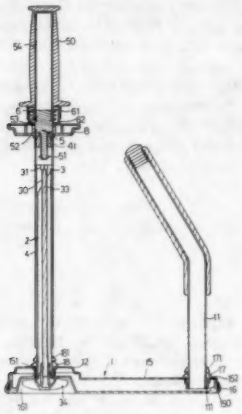
1. A film dispenser particularly suited for wrapping plastic packing film under tension about an object of large volume wherein the dispenser comprises

a rigid base tapering from a wide portion to a narrow portion,

a handle extending from said narrow portion,

an adjustable film roll support means extending from said wide portion and comprising an elongated wedging means telescoping within an outer tube, said wedging means cooperating with said outer tube to secure said tube at a

desired extension, and tension applying means attached to said outer tube at the upper end thereof cooperating with



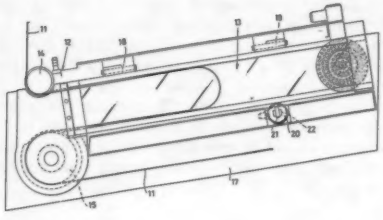
said base to apply tension across the width of a roll of packing film.

4,714,212

PNEUMATIC TAPE TENSIONING DEVICE FOR A CASSETTE LOADING MACHINE

Angelo Bosco, San Donato, and Edgardo Magnaghi, Peschiera Borromeo, both of Italy, assignors to Telefunken Robetecnica S.R.L., Sao Gio Vanni, Italy

Filed Oct. 14, 1986, Ser. No. 918,328
Claims priority, application Italy, Oct. 11, 1985, 22451 A/85
Int. Cl.[4] B65H *19/20;* G11B *15/58*
U.S. Cl. 242—182 **6 Claims**



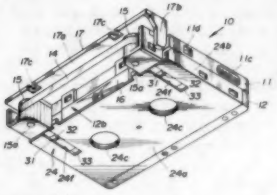
1. A tape-tensioning arrangement in a machine for the loading of tape onto cassettes, including a tape-tensioning mechanism located between a spool from which tape is wound off and two processing stations at which alternative loading of cassettes takes place comprising: a closed tensioning container having an inlet and outlet and on the inside of which a vacuum is utilized to tension the tape and into and out of which the tape coming from the spool enters and exits, curved elements for guiding the tape into the inlet and out of the outlet of the container, wherein said tensioning container and the respective curved element for the guiding of the tape from its outlet are both mounted on a joint carrier that is pivotally mounted, and control means are provided to angularly pivot and thus shift said carrier alternately into one or the other of two positions, aligned to one or the other of the two processing stations in order to feed the tape directly to the correct station.

4,714,213

MAGNETIC TAPE CASSETTE WITH MAGNETIC TAPE PROTECTIVE CLOSURE AND BIAS MEANS THEREFOR

Toshihiro Watanabe, and Hiroshi Meguro, both of Miyagi, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 18, 1986, Ser. No. 886,685
Claims priority, application Japan, Jul. 26, 1985, 60-114800
Int. Cl.[4] G03B *1/04;* G11B *23/04*
U.S. Cl. 242—198 **13 Claims**



1. A magnetic tape cassette comprising:

a cassette casing housing a pair of tape reels and defining a cut-out formed at the front end of its floor and a front end opening through which a magnetic tape is exposed to the outside of said cassette casing;

a closure member slidingly attached to said cassette casing for openably closing said cut-out, said closure member being movable between a first position closing the cut-out and a second position shifted rearwardly from said first position and thereby opening said cut-out; and

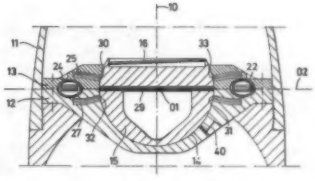
a torsion spring associated with said closure member for biasing the latter toward said first position, said torsion spring being secured to said closure member for movement therewith and having one end engaging the inner periphery of said cassette casing so as to accumulate spring force as said closure member shifts toward said second position.

4,714,214

APPARATUS FOR PRODUCING BIAXIAL TILTABLE SUPPORT FOR A ROTATIONAL BODY

Lars J. Schleimann-Jensen, Danderyd, and Fred H. E. Anderson, Järfälla, both of Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 20, 1986, Ser. No. 865,223
Claims priority, application Sweden, May 22, 1985, 8502509-6
Int. Cl.[4] F42B *15/02;* G01C *19/06*
U.S. Cl. 244—3.16 **20 Claims**



1. Apparatus for producing biaxial tiltable support of a rotational body comprising:

a rotational body having an at least partly outer spherical surface portion;

a stationary part having a recess therein with an inner spherical surface portion substantially corresponding to the outer spherical surface portion of said rotational body, said body being rotationally disposed in said stationary part on a spin axis;

means for maintaining a small gap between the inner and

outer spherical surface portions of said stationary part and said rotational body respectively;

torque producing means being arranged about said rotational body for producing torques on said body causing controlled tilting thereof with respect to two mutually perpendicular turning axes normal to said spin axis;

the improvement characterized in that said torque producing means comprises:

a plurality of magnetic yokes in said stationary part, electrical windings being on each of said yokes, each of said yokes having magnetic poles at its ends, each of said poles being situated on the inner spherical surface portion of the recess of said stationary part and being substantially diametrically opposite one another;

said rotational body comprising a part of magnetic material terminating at the outer surface portion of said body for forming return paths for magnetic flux flowing between each of said poles of each respective one of said plurality of yokes, the magnetic part having a center plane passing through it; and

each of the poles of said respective one of said plurality of yokes being arranged obliquely relative to the center plane of the magnetic part with respective opposing poles situated on an opposite side of the center plane in a non-deflected position of said body;

whereby in response to selective activation of the electrical windings of said plurality of yokes, by cooperation between the magnetic poles of the yokes and the magnetic part of said body, torques are transferred to said body producing controlled tilting of said body with respect to the mutually perpendicular turning axes.

4,714,215

AIRCRAFT WING AND WINGLET ARRANGEMENT

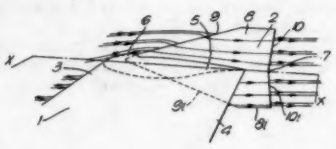
Jeffrey A. Jupp, Filton, and Peter H. Rees, Hatfield, both of United Kingdom, assignors to British Aerospace PLC, London, England

Continuation-in-part of Ser. No. 601,081, Apr. 16, 1984, abandoned. This application Jun. 12, 1986, Ser. No. 873,526

Claims priority, application United Kingdom, Apr. 15, 1983, 8310224

Int. Cl.[4] **B64C** *23/06*

U.S. Cl. 244—199 **2 Claims**



1. An aircraft wing including, main wing means (1) having a median plane (X—X) and a wing tip regior of specified chord having a leading edge region (3) and a trailing edge region (4) and winglet means (2) extending upwards and/or downwards from the median plane (X—X) of said wing tip region, the winglet means having a root region (5) with both a forward extremity (6) and a rearward extremity (7) in the region of the median plane, the forward extremity of the winglet means lying at or rearward of the leading edge region of the main wing means, a tip region (8) remote from the median plane, a leading edge region (9) extending between the forward extremity and the tip region of high sweep back (Q) over at least part of its length, and a trailing edge region (10) extending between the rearward extremity of the root region and the tip region, the value of the square of the distance from the tip region to the root region divided by the area bounded by and including the root region, the tip region, the leading edge region, and the trailing edge region being 1.5 or less, and characterized by having a cambered profile which is so shaped to cause a median line (44) to droop at the leading edge region (9) in a direction outboard with reference to the main wing means when said winglet means (2) extends upwards from said median plane (X—X) and in a direction inboard with reference to the main wing means when the winglet means (2) extends downwards, whereby in air flow break-away conditions the air flow over the winglet means changes from conventional attached flow to vortex flow and the vortex sheets of said vortex flow extend over an inboard facing surface of the upwardly extending winglet means and over an outboard facing surface of the downwardly extending winglet means, and whereby the bending load exerted upon the main wing means by the presence of the winglet means increases relatively slowly as main wing lift increases.

4,714,216

FIN ERECTING MECHANISMS

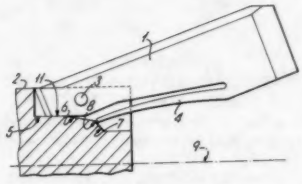
Spencer D. Meston, and John W. Phillips, both of Bristol, United Kingdom, assignors to British Aerospace Public Limited Company, England

Filed Mar. 24, 1986, Ser. No. 843,382

Claims priority, application United Kingdom, Mar. 23, 1985, 8507614

Int. Cl.[4] **B64C** *5/12*

U.S. Cl. 244—3.29 **14 Claims**



1. A fin erecting mechanism comprising:

support means;

a fin member including means for pivotably attaching said fin member to the support means and which is movable from a stowed to a deployed position; and

spring means attached to the fin member at one end and which is supported by the support means at the other end, the spring means being operable to deploy the fin member by moving it from its stowed to its deployed position said spring means comprising a cantilever, said cantilever attached to said fin member at a point remote from said attached means, said cantilever having a free end extending toward said attaching means.

4,714,217

KITE LINE TAKE-UP DEVICE

Daniel Prentice, 2021 Folsom St., San Francisco, Calif. 94110

Filed Feb. 26, 1986, Ser. No. 833,908

Int. Cl.[4] **B64C** *31/06;* **B65H** *75/40*

U.S. Cl. 244—155 R **17 Claims**

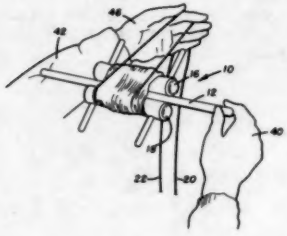
1. A control and take-up assembly for use with a multi control line kite comprising:

an axle;

a pair of elongated handles, each having an axis, each handle having affixed thereto at least one of the control lines;

means for temporarily affixing said elongated handles to said axle to form a take-up assembly such that the axes of said

handles are substantially parallel to the axis of said axle, and the handles laterally displaced on opposite sides of

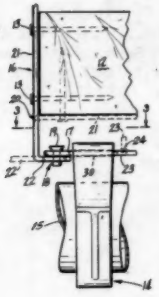


said axis of said axle a distance at least equal to the radius of said axle.

4,714,218
HANGER FOR PIPE CLAMP

Charles S. Hungerford, Jr., 6 Beechwood Ct., Woodbury, Conn. 06798

Filed Jul. 17, 1986, Ser. No. 886,411
Int. Cl.[4] F16L *3/02*
U.S. Cl. 248—62 **10 Claims**



1. In combination, a support bracket and a pipe clamp, said bracket defining a pair of relatively movable strap means, a first strap means being operable to connect with a fixed support at a selected position, fastening means for effecting the connection between said first strap means and said fixed support at said selected position and a second strap means operable to engage releasably said pipe clamp whereby said pipe clamp can be spaced from said fixed support a distance which is a function of said selected position, said pipe clamp being operable in said spaced condition to engage said second strap means with freedom to assume a plurality of angular or rotational positions relative to said fixed support wherein the first strap means and the second strap means in the hinged condition define an L-shaped configuration, so that said pipe clamp when engaged by said second strap means is rotatable relative to said first strap means when said first strap means is secured to said fixed support through at least 180°.

4,714,219
CHRISTMAS LIGHT HANGERS

Noble R. Mayse, P.O. Box 5973, Concord, Calif. 94524

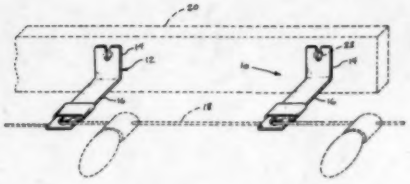
Filed Jan. 8, 1987, Ser. No. 1,411
Int. Cl.[4] F16L *3/08*
U.S. Cl. 248—65 **5 Claims**

1. A christmas light string holder, comprising:

a. bracket means having first and second legs, said bracket means having a substantially L-shaped design;

b. first slot means formed in said first leg, said first slot means facilitating an attachment of said first leg to a static structure through a use of a fastener;

c. second slot means formed in said second leg, said second slot means serving to receive said Christmas light string so



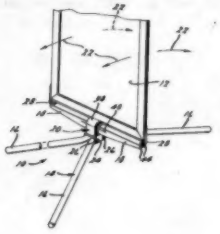
as to effect a securement thereof to said holder, said second slot means including a first slot portion formed in said second leg and a second slot portion in communication with said first slot portion and being substantially orthogonally directed relative thereto; and,

d. locking means for fixedly holding said Christmas light string in said second slot means, said locking means comprising a slidable sleeve movable along said second leg.

4,714,220
SIGN STAND ASSEMBLY

David U. Hillstrom, Novi, Mich., and Dennis R. Cope, Kent, Ohio, assignors to Marketing Displays, Inc., Farmington Hills, Mich. and B. F. Goodrich Company, New York, N.Y.

Continuation-in-part of Ser. No. 824,745, Jan. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 784,906, Oct. 7, 1985, abandoned. This application Sep. 9, 1986, Ser. No. 905,673
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—160 **45 Claims**

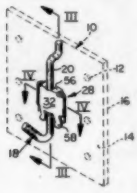


1. A sign stand assembly for supporting a sign, said sign stand assembly comprising: a base; at least one sign-supporting member securable to the sign; and resilient biasing means interconnecting said base and said sign-supporting member for normally biasingly supporting said sign-supporting member in a generally upright position relative to said base, said resilient biasing means including at least one elastomeric member resiliently and torsionally deflectable about a torsion axis for allowing said sign-supporting member to pivotally deflect relative to said base from said generally upright position in response to predetermined forces exerted on said sign-supporting member, and said sign stand assembly further including means for compressively preloading said elastomeric member.

4,714,221
PEGBOARD BRACKET RETAINER

Philip G. Cawrey, 1573 Alvamar Dr., Lawrence, Kans. 66046

Filed Feb. 25, 1987, Ser. No. 18,424
Int. Cl.[4] A47B 96/06
U.S. Cl. 248—221.1 14 Claims

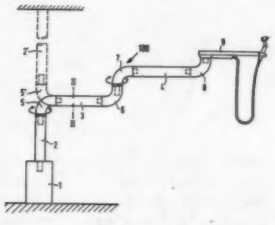


1. A retainer for perforated board brackets wherein the board includes front and rear surfaces intersected by perforations and the bracket includes an elongated stem located adjacent the board surface, comprising, in combination, a rear member adapted to be inserted between the bracket stem and the board front surface, said rear member including lateral edges and first and second end regions, a front member having lateral sides defining a horizontal width as great as the width of said rear member and first and second end regions, guides defined upon said front member lateral sides mating with said rear member lateral edges whereby said front and rear members may be interconnected with the bracket stem located therebetween, stem locating means defined upon one of said members, and a stabilizer projection defined upon one of said rear member end regions for reception into a board perforation.

4,714,222
BRACKET STRUCTURE FOR DENTAL PURPOSES

Helmut Kiesel, and Klaus Stoecki, both of Bensheim, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 26, 1985, Ser. No. 801,878
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1984, 3445020
Int. Cl.[4] E04G 3/00
U.S. Cl. 248—282 17 Claims



1. In a bracket structure having one or more straight carrier members and elbow members, the improvement comprising at least one of the carrier members and at least one of the elbow members having mutual mating plug-in parts to form a rigid connection therebetween with coacting means including ridges and channels to prevent twisting between the parts and to enable a disassembly of the parts and reassembly with the positions offset relative to one another by at least 180°.

4,714,223
MOUNTING DEVICE FOR FOG LAMP

Masashi Kamaya, Tokyo, Japan, assignor to PIAA Corporation, Tokyo, Japan

Filed Oct. 22, 1986, Ser. No. 921,441
Int. Cl.[4] E04G 3/00
U.S. Cl. 248—291 3 Claims

1. A mounting device for a fog lamp having a frame and comprising:

a support mounted on a vehicle, said support including rounded protrusions formed on opposite sides thereof;

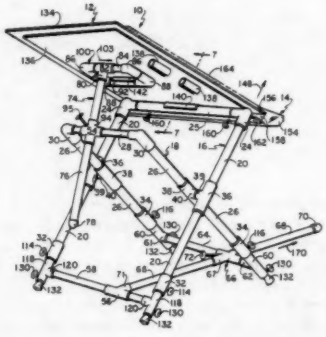
a pair of rotating parts having rounded depressions engageable with the protrusions; and

a pair of bolts swivelingly connecting said pair of rotating parts with said support wherein said pair of rotating parts are connected to said frame of the fog lamp.

4,714,224
COLLAPSIBLE EASEL FOR ARTISTS

Bobbie G. Calmes, 2449 Seracedar St., Baton Rouge, La. 70816

Filed Mar. 12, 1987, Ser. No. 25,185
Int. Cl.[4] A47B 97/08
U.S. Cl. 248—465 7 Claims



1. A collapsibie easel for use by an artist comprising in combination; a platform structure having a supportive top surface area, opposite side edges, opposite end edges, receiving means secured to one end portion and one side portion of the back surface area and a co-pivotal receiving means securing one of its ends to the central portion thereof, having its opposite end pivotal 360 degrees therefrom; and

a composite outer leg unit including a first pair of parallel main legs having upper ends connecting at right angles to opposite ends of an inwardly disposed rigid horizontal member interconnecting a rotatable outwardly disposed first upper horizontal member, and lower ends connected to a first pair of opposed side coupling means, a first lower horizontal member having opposite ends connected at right angles, by a first pair of opposed side rigid connective means, to lower ends of a first parallel pair of co-extendible auxiliary legs correspondingly housed longitudinally in said first pair of main legs, a pivotal connective

means engaged in the horizontal axis of said first lower horizontal member; and

a composite inner leg unit appropriately shorter in overall length and width than said composite outer leg unit includes a second pair of parallel main legs having upper ends connecting at right angles to opposite ends of a second upper horizontal member, and lower ends connected to a second pair of opposed side coupling means, a second lower horizontal member having opposite ends connected at right angles, by a second pair of opposed side rigid connective means, to lower ends of a second parallel pair of co-extendible auxiliary legs correspondingly housed longitudinally in said second pair of main legs, a first pivotal guide means pivotally interconnected in the horizontal axis of said second lower horizontal member, by bearing means contained therein, having a first releasable locking means, a second pivotal guide means pivotally interconnected in the horizontal axis of said second upper horizontal member, by bearing means contained therein, having a second releasable locking means; and

said composite leg units share a stabilizer bar means having one end secured into said pivotal connective means extending perpendicularly in alignment therefrom slidably engaging through said first pivotal guide means connecting its opposite free end into a cap means, co-axial means interconnected between the upper and lower ends of each said first and second main leg having opposite facing branch members pivotally joined by bearing means contained therein in a common horizontal axis thereof, thereby enabling said composite leg units to be pivoted in opposite directions away from their inoperative co-planar collapsed position to operative extended positions within quadrant arcs thereof pivotally disposing said stabilizer bar means respectively from an inoperative vertical position to an operative horizontal position thereof and locking therein by said first locking means to supportively maintain said extended positions; and

leveling legs individually housed longitudinally in each said auxiliary leg having their outer lower ends secured into individual base member; and

each said pair of auxiliary legs co-extend slidably downward from their respective housed positions thereby providing said easel with height and leveling adjustment when same is in an operative extended position; and

each said leveling leg individually extend slidably downward from their respective housed positions thereby providing said easel with leveling and height adjustment when same is in an operative extended position; and

each said side coupling means and each said side rigid connective means include a releasable locking means in their lower portions maintaining respectively said auxiliary legs and said leveling legs in their extended or fully retracted positions and each also include a bushing means secured into lower apertures corresponding to said auxiliary and leveling legs; and

said composite inner leg unit also includes a pivotal support means comprised of a slidable hinging connective means, a turn-mount means interconnected at right angles to a parallel pair of opposite side members, having a lever bar means connecting one end into said hinging connective means extending perpendicularly therefrom intersecting slidably through said second pivotal guide means connecting its opposite end into a cap means, thereby providing a pivotally coordinated counter pivotal structure thereof, transferable from an inoperative co-planar position in said composite inner leg unit to operative pivotal and translatable positions within a 360 degree arc from said second upper horizontal member when said composite leg units are pivotally extended in said operative positions.

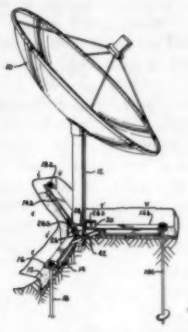
4,714,225
FOUNDATION SYSTEM FOR GROUND-MOUNTED MASTS

Jerald P. Skinner, 3014 Eveningside Dr., Topeka, Kans. 66614; Richard A. Zlotky, 246 Yorkshire, Topeka, Kans. 66606, and Robert L. Diel, 2537 Michigan, Topeka, Kans. 66605

Continuation-in-part of Ser. No. 751,622, Jul. 2, 1985, abandoned. This application Sep. 9, 1986, Ser. No. 905,509

Int. Cl.[4] F16M *13/00*

U.S. Cl. 248—523 **7 Claims**



1. In combination, a portable in-ground foundation system mounting a pipe mast comprising:

a foundation structure adapted for installation in the ground just below the surface thereof and having a central mounting hub receiving a lower end portion of said mast,

said structure comprising a plurality of initially separate, unitary arms each having an inner end at said hub and radiating outwardly therefrom to present an outer end remote from said hub,

a plurality of thin shaft, screw-type earth anchors each having a shank secured to and depending from a corresponding arm adjacent the outer end thereof for anchoring the foundation system in the ground,

the inner end of each arm being provided with a clamp element integral therewith and partially embracing said mast,

said clamp elements on respective arms presenting said mast-receiving hub and each such element including a collar segment conforming to said mast to provide surface-to-surface contact therewith,

fastening means releasably joining said clamp elements together and uniting said arms in a manner such that said collar segments circumscribe said lower end portion of the mast to provide a torsion-resistant joint supporting the mast on the arms, and

adjustable means connecting said shanks of the anchors to said arms for leveling said structure.

4,714,226
METHOD AND APPARATUS FOR MOUNTING A DAVIT ON A ROOF STRUCTURE

Stephen E. Tracy, Seattle, Wash., assignor to Spider Staging, Inc., Renton, Wash.

Filed Jun. 24, 1986, Ser. No. 877,807

Int. Cl.[4] F16M *13/00*

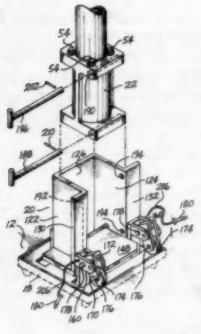
U.S. Cl. 240—544 **24 Claims**

16. A davit mount, comprising:

a base member formed to include a pair of spaced apart front and rear first and second hook receiving openings, said hook receivinng channel openings being substantially rectangular in shape, being long and narrow, and being parallel to each other, a support portion between the hook receiving openings and hook engaging portions bordering said hook receiving openings;

a mobile davit socket having first and second sidewalls spaced opposite each other, a front wall interconnected between the first and second sidewalls, a bottom, an open top, and a rear open fourth side, first hook means depending from the socket on the open fourth side of the socket, said first hook means including a first end wall which depends downwardly from the socket, and a first hook member which extends forwardly from said first end wall, and second hook means depending from the front wall the socket, said second hook means including a second end wall which extends downwardly from the socket, and a second hook member which extends downwardly from the socket, and a second hook member which extends laterally from said second end wall in the same direction as the first hook member, and away from the socket;

said hook receiving openings in the base member being sized and shaped to receive the hook members when said hook members are aligned with said hook receiving openings, so that the davit socket can be transported to the base member and the hook members put into alignment with the hook receiving openings in the base member, and the socket can be moved to insert the hook members through said hook receiving openings and place the bottom of the



socket on the support portion of the base member between the hook receiving openings, and then the socket can be shifted in the direction that the hook members extend, to place the hook members below the hook engaging portions of the base member, said shifting movement creating an open space in the hook receiving opening into which the first hook member was inserted, rearwardly of the first end wall;

a swing member located between the first and second sidewalls, said swing member having first and second ends, and hinge means pivotally connecting the first end of said hinge member to the first and second sidewalls at positions near the bottom and the front wall of the socket, for swinging movement of said swing member between an up position and a down position; and

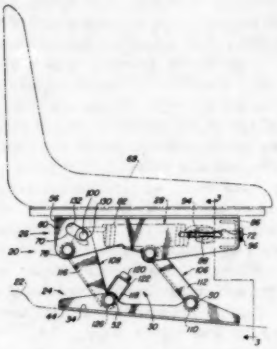
a filler member connected to said swing member, said filler member being positioned such that when the swing member is in its down position the filler member is received within said space in the hook receiving opening which is positioned outwardly of the first end wall, and such filler member is in a position to block a shifting movement of the socket back into a position in which the hook members are in removal alignment with the hook receiving openings.

4,714,227

SEAT SUSPENSION FOR AN OFF-ROAD VEHICLE

David R. Holm, Oconomowoc, and Rudolph A. Peterson, Jr., Horicon, both of Wis., assignors to Deere & Company, Moline, Ill.

Filed Nov. 17, 1986, Ser. No. 931,286
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—595 **18 Claims**



1. A seat suspension system for an off-road vehicle comprising:

means for connecting said suspension to said vehicle;

means, operatively connected to said suspension connection means,for connecting a seat to said suspension;

means, operatively connected to said seat connection means, for attenuating the acceleration of said seat connection means toward said suspension connection means; and

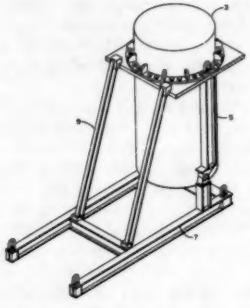
means, operatively connected to said suspension connection means, for directly contacting said attenuation means prior to said suspension connection means and said seat connection means colliding thereby reducing the sudden jerk produced by said collision.

4,714,228

SELF-ADJUSTABLE SUPPLEMENTAL SUPPORT SYSTEM FOR A CYLINDRICAL CONTAINER IN A HOUSING

Ronald M. Blaushild, Wilkinsburg, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 30, 1987, Ser. No. 10,505
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—608 **9 Claims**



1. A self-adjustable supplemental supporting system for a cylindrical container having an external surface within a cylin-

drical housing having an inner surface, wherein the container has an outwardly extending flange at the upper region thereof resting on a radially inwardly directed complementary support flange about the upper region of the inner surface of the cylindrical housing and axially supporting the cylindrical container within the housing at a spaced relation from the inner surface and bottom of the housing, comprising:

a support ring attached to the external surface of the cylindrical container;

a plurality of radially outwardly extending bracket units secured to said support ring; and

a plurality of resilient supporting bar units secured to the inner surface of said cylindrical housing in confronting relationship to said bracket units; such that the bracket units are seated on said resilient supporting bar units to prevent radial movement of the cylindrical container within the cylindrical housing.

4,714,229

ANTI-VIBRATORY SUPPORT DEVICE FOR A PIPE WHOSE THICKNESS IS SMALL RELATIVE TO THE DIAMETER

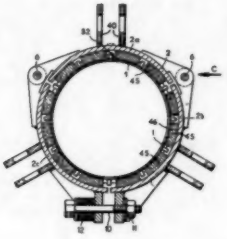
Christian Force, St. Cheron, and Alain Lescure, Chaville, both of France, assignors to Novatome, Le Plessis-Robinson, France

Filed Apr. 26, 1985, Ser. No. 727,645

Claims priority, application France, Apr. 27, 1984, 84 06642

Int. Cl.[4] F16L *3/10*

U.S. Cl. 248—610 **7 Claims**



1. An anti-vibratory support device for a pipe whose thickness is small relative to its diameter and whose operating temperature is elevated, said device comprising a collar for fixing to an installation in which the pipe is to be mounted and surrounding the pipe in such manner as to define an annular space around the pipe, and a deformable and elastic annular means interposed between the collar and the pipe, said collar comprising at least two rigid annular sectors disposed in the extension of one another in spaced relation so as to define a gap therebetween, each rigid sector carrying at at least one of its ends, articulation means substantially complementary to articulation means carried by the succeeding rigid sector, so as to constitute an articulation having an articulation axis parallel to an axis common to the pipe and the collar, an elastic junction means interconnecting at least two successive rigid sectors at one end of the rigid sectors and enabling the collar to be closed, and the deformable annular means interposed between the collar and the pipe comprising at least two successive deformable annular sector structures, each sector structure comprising a maintaining case fixed to a rigid sector of the collar and having a cylindrical inner bearing wall having the same diameter as the pipe, and a plurality of parallelepipedic pads made from knitted stainless steel wire disposed in said case and interposed between an inner cylindrical surface of the collar and said inner bearing wall of the case, said elastic junction means of the collar permitting the exertion of forces of radial direction on the deformable annular sector structures so as to put them under compression between the collar and the pipe.

4,714,230

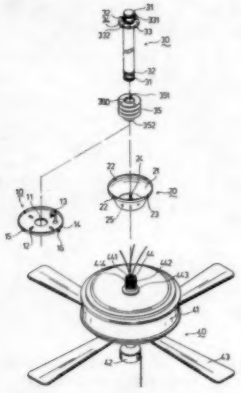
CONVERTIBLE SUSPENSION MOUNTING SYSTEM FOR CEILING FANS

Ming-Chien Huang, Taichung Hsien, Taiwan, assignor to St. Island Intl. Patent & Trademark Office, Taipei, Taiwan

Filed Sep. 30, 1985, Ser. No. 781,914

Int. Cl.[4] B42F *13/00*

U.S. Cl. 248—613 **1 Claim**



1. A convertible suspension mounting system for use with a ceiling fan which utilizes a support structure comprising a disk member having a central opening and a plurality of threaded orifices provided therein for being fastened to a ceiling surface and a housing body having an annular opening and screw holes in its bottom side and a plurality of round holes in its upper periphery connected to the disk member through the threaded orifices, the ceiling fan having a threaded pipe fitting provided on top thereof for effecting connection with the support structure, said mounting system operations comprising:

a tubular connecting member having a threaded portion and a through hole respectively provided at its upper and lower portions for being vertically received at its upper portion in the annular opening of the housing body and for permitting connection at its lower portion to the threaded pipe fitting of the ceiling fan;

a circular coupling member, whose diameter is larger than that of the annular opening of the housing body, having an axial opening in its center, with a diameter larger than that of the connecting membes, and a plurality of screw holes located in its side surface, said coupling member being connected to the upper portion of said connecting member through the axial opening;

a stop element fixed in the through hole at the upper portion of said connecting member over said circular coupling member to secure the latter in position; and

an axially flexible pipe sleeve of shock absorbing material having a through opening with a diameter larger than that of the connecting member and smaller than that of said circular coupling member positioned around the upper portion of said connecting member between said circular coupling member and the bottom side of the housing body, a reinforced portion formed at the top and bottom areas of said sleeve;

a plurality of screw holes symmetrically located therein for permitting connection with said circular coupling member and the bottom side around the annular opening of the housing body; and

a tubular neck portion formed around its lower end with a diameter larger than that of the through opening and smaller than that of the annular opening of the housing body for movably receiving the upper portion of said connecting member therein,

said connecting member thereby being provided with suffi-

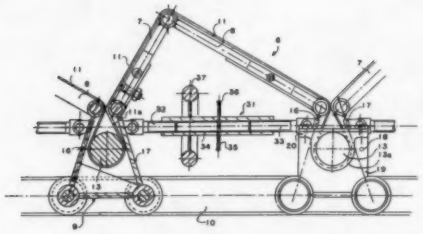
cient axial deviation so as always to be kept perpendicular to the ground level of a building in which the ceiling fan is mounted under various ceilng conditions.

4,714,231

ADJUSTABLE MOLD FOR THE MANUFACTURE OF CONCRETE ELEMENTS SUCH AS STAIRCASES

Bernard Colman, 7 Rue Jean Bouyssou, 31500 Toulouse, France

Filed Apr. 8, 1986, Ser. No. 850,909
Int. Cl.[4] B28B *7/22*
U.S. Cl. 249—14 **17 Claims**



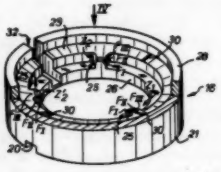
1. Adjustable mold for the manufacture of concrete staircase elements, said mold comprising a frame (1) on which is mounted a base (2), a forward lateral wall, a rear lateral wall (4) and two longitudinal walls (5), the said base being constituted by juxtaposed molding elements (6) each arranged in a dihedral angle which dihedral angle is constituted by a wall (7) intended to form the tread and by a wall (8) intended to form the riser characterized in that each molding element (6) is supported by carriages (9) movably mounted on horizontal guide rails (10), longitudinal to the mold, mounted on the frame (1) and in that a flexible strip (11) sealed to the concrete is stretched by stretchers (12) mounted at each extremity of the mold and is forced to cover and to conform to the shape of the base (2) of the mold by winding on rollers (13), each roller being mounted beneath the base (2) between two molding elements (6), and by gripping between the molding elements when these latter are maintained pressed the ones against the others by jacks (14).

4,714,232

BEARING RING FOR FIXING A MOUNTING BLOCK ON THE PROGRESSIVELY VARIABLE CURVED FINISHED FACE OF A SEMI-FINISHED LENS OR MOLD BLANK

Gérard Blot, Draveil, France, assignor to Essilor International Cie Generale d'Optique, Creteil, France

Filed Jan. 23, 1986, Ser. No. 824,562
Claims priority, application France, Feb. 1, 1985, 85 01422
Int. Cl.[4] B24B *4/06*
U.S. Cl. 249—90 **14 Claims**



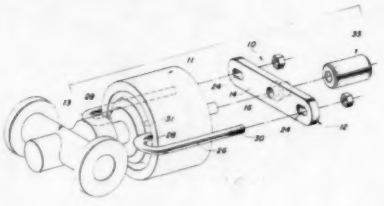
1. A bearing ring for semi-finished ophthalmic lens or lens mold blanks having progressive convex faces of different curvature, said bearing ring comprising a plurality of bearing areas for contact with any selected one of a plurality of different semi-finished blanks within a selected range, said bearing areas being circumferentially spaced around an axis, said bearing ring having a reference plane perpendicular to said axis and axially inwardly of said bearing areas, all of said bearing areas being generally inclined relative to said reference plane, each of said bearing areas extending between two bearing areas ends radially and axially offset relative to each other, each of said bearing areas having a median plane containing said axis and extending radially through a middle of said bearing area, planes tangential to respective ends of each of said bearing areas and orthogonal to said medial plane forming an obtuse dihedron having a concave side facing towards said reference plane, each of said bearing areas comprising a plurality of bearing facets for selective contact with a semi-finished blank, all of said bearing facets being generally inclined relative to said reference plane and all being orthogonal to the corresponding median plane, the inclination of each of said bearing facets of each of said bearing areas being different from that of other bearing facets of the same bearing area, said bearing facets being in radial succession on circumferences of different diameter according to their inclination, end bearing facets of each of the bearing areas being coincident with corresponding end tangential planes.

4,714,233

ADAPTER BRACKET FOR MAKING A VALVE FIRE SAFE

Danny R. Oates, Lake Charles, La., assignor to Conoco Inc., Ponca City, Okla.

Filed Jan. 20, 1987, Ser. No. 5,533
Int. Cl.[4] F16K *31/00*
U.S. Cl. 251—14 **5 Claims**



1. Apparatus for converting a conventional gate valve to a fire safety valve, wherein said gate valve includes a slide gate operated by an actuator which overcomes a biasing spring and maintains said valve in an open position by fluid pressure and an end of an actuator rod which projects beyond a first surface of an actuator housing, said apparatus comprising:

an adapter plate, said plate having a first flat side, with a cylindrical extension protruding from a second opposite side of said adapter plate, said cylindrical extension having an inner diameter sufficiently large to non-engagingly receive said actuator rod, the outside of said cylindrical extension being threaded;

means for securing said adapter plate to the exterior of said actuator housing with said first flat side toward said actuator housing;

said cylindrical extension being adapted to be threadingly engaged by an actuator rod-engaging cap, at least a portion of said rod-engaging cap being made of fusible material, said fusible material portion of said cap engaging the end of said actuator rod;

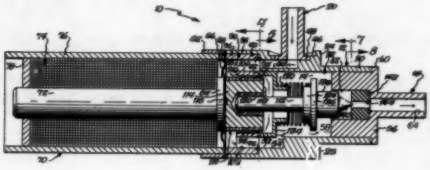
wherein said rod-engaging cap engages the end of said actuator or rod and holds said valve in its open position inspite of the loss of fluid pressure unless and until said fusible material is exposed to sufficient heat to melt it, whereby said fusible material will significantly contract enabling said valve to close under action of said biasing spring in the absence of fluid pressure.

4,714,234

LOW POWER ELECTROMAGNETIC VALVE

Theodore J. Falk, Clarence, and Lawrence E. Morris, Bowmansville, both of N.Y., assignors to Greatbatch Enterprises, Inc., Clarence, N.Y.

Continuation of Ser. No. 415,672, Sep. 9, 1982, abandoned. This application Jul. 11, 1985, Ser. No. 754,203
Int. Cl.[4] F16K *31/04*
U.S. Cl. 251—129.17 20 Claims



16. In an electromagnetic valve including a housing having an interior fluid containing region including first and second chambers, first and second ports in fluid communication with said first and second chambers, respectively, electromagnet means carried by said housing and located external to said fluid containing region of said housing, and an armature positioned in said fluid containing region of said housing having a pole portion located between said first and second chambers for magnetic attraction by said electromagnet means causing movement of said armature for opening and closing one of said ports, the improvement comprising:

(a) barrier means of fluid-impervious material separating said electromagnet means and said fluid containing region of said housing;

(b) a body of magnetically permeable material in said housing fluid containing region between said first and second chambers and having a passage therethrough for receiving said armature pole portion in a movable, close-fitting relation, said body having a fluid passage therein in fluid communication with said first and second chambers and separate from said armature pole portion receiving passage to allow fluid in said region to flow through said body between said first and second chambers; and

(c) means for defining a magnetic circuit including said electromagnet means, said body, the included portions of said barrier means between said electromagnet means and said body, said armature pole portion and a gap in said fluid containing region of said housing between said armature pole portion and said electromagnet means for moving said armature toward said electromagnet means to close said gap in response to electrical energization of said electomagnet means.

4,714,235

CONSTANT DISPLACEMENT DUAL POSITION CAM STOP ASSEMBLY

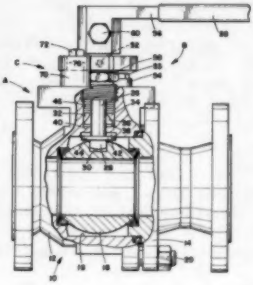
Cal R. Brown, Euclid; Michael T. Gallagher, Mayfield Hts., and Peter C. Williams, Cleveland Heights, all of Ohio, assignors to Whitey Co., Highland Hts., Ohio

Filed Jun. 16, 1986, Ser. No. 873,005
Int. Cl.[4] F16K *51/00*
U.S. Cl. 251—288 8 Claims

1. A stop assembly for a valve including a valve member mounted for rotational movement between first and second positions and including a rotatable drive member for moving said valve member between said first and second positions, said stop assembly comprising:

a stop member operatively associated wtih said drive member for rotation representative of drive member rotation;

a cam member adjustably mounted on said valve for engagement with said stop member to adjustably define said first and second positions, said cam member being configured to maintain a constant preselected angular spacing between said first and second positions irrespective of its position of adjustment.

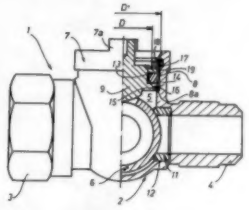


4,714,236

BALL VALVE, PARTICULARLY FOR GASES

Antonio Filiberti, Via Per Alzo, 48, 28017 S. Maurizio D'Opaglio, Novara, Italy

Continuation-in-part of Ser. No. 846,033, Mar. 31, 1986, abandoned. This application Jan. 30, 1987, Ser. No. 8,778
Claims priority, application Italy, Jan. 24, 1986, 20736/86[U]
Int. Cl.[4] F16K *3/22*
U.S. Cl. 251—315 11 Claims



1. A ball valve, comprising:

(A) a valve body bounding a fluid flow-through passage and having a tubular jut extending along an axis;

(B) inlet and outlet fittings on the body and communicating with the passage;

(C) a ball shutter mounted in the passage for turning about the axis;

(D) a pair of seals mounted in the passage on opposite lateral sides of the shutter, each seal sealingly engaging a respective fitting and a respective side of the shutter during said turning;

(E) control means for opening and closing the valve, including a control block mounted in the jut for turning about the axis and operatively connected to the shutter, and a handle located exteriorly of the body and mounted on the control block for turning the latter and, in turn, the shutter about the axis between open and closed valve positions;

(F) means on the jut for bounding an annular, enlarged groove which opens radially inwardly toward the axis;

(G) said control block having a mounting surface, and an annular, reduced neck extending axially above the mounting surface; and

(H) means for aligning the control block for turning about the axis, including

(i) an annular washer surrounding the reduced neck with radial clearance and mounted on the mounting surface for radially inward displacement toward the neck, and

for radially outward displacement into the enlarged groove, and

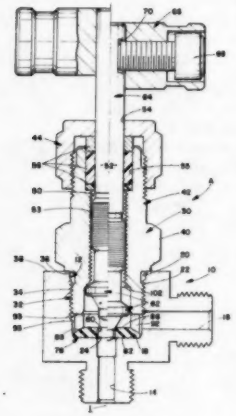
(ii) an elongated resilient locking element insertable lengthwise into and along the enlarged groove, said locking element resiliently bearing against, and inwardly and outwardly displacing, different portions of the washer during such insertion, said locking element lockingly securing the control block in alignment with the axis after insertion.

4,714,237

SOFT SEAT FOR METERING VALVE

Ray D. Linderman, Streetsboro, and Peter C. Williams, Cleveland Heights, both of Ohio, assignors to Whitey Co., Highland Hts., Ohio

Filed May 14, 1986, Ser. No. 863,598
Int. Cl.[4] F16K 1/42
U.S. Cl. 251—330 2 Claims



1. A metering valve comprising:

a valve body having a valve chamber and first and second passages communicating therewith on opposite sides of a valve seat in said valve chamber, said first passage extending through an end wall of said chamber and said second passsage extending through a sidewall thereof;

a bonnet member operatively associated with said valve chamber at an open area spaced from said end wall;

an annular unitary, non-metallic seat insert closely received in said valve chamber, said seat insert including:

a base portion having a first surface in mating relation with said end wall and a second surface generally parallel and spaced from said first surface, said base portion also having an aperture extending therethrough for generally coaxial communication with said first passage, said base portion first surface including a generally planar annular region surrounding said aperture and a radially tapering surface portion extending axially from said planar annular region toward said second surface at an outer periphery of said base portion,

plural leg portions extending outwardly from said tapering surface portion generally axially of said seat insert for abutting engagement with and axial encapsulation by said bonnet member such that said seat insert is secured against rotational and axial movement in said valve chamber, said leg portions being disposed radially inward from said base portion outer periphery and having a predetermined peripheral width dimension less than the cross-sectional dimension of said second passage to facilitate fluid flow between said passages in any rotated position of said seat insert in said valve chamber; and,

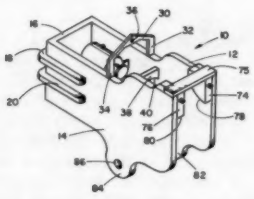
a valve stem operatively received through said bonnet member for selective advancement and retraction relative to said valve seat, said valve stem having an axial length such that advancement of said valve stem toward said valve seat in the absence of said seat insert provides abutting sealing engagement between said valve stem and valve seat.

4,714,238

HYDRAULIC JACKING SYSTEM FOR UNSEATING WEDGE FROM ROPE SOCKETS

Willie D. Spradley, Rte. 2, Box 155 G, Carthage, Tex. 75633, and Paul J. Creswell, Rte. 1, Box 274, Beckville, Tex. 75631

Filed Mar. 5, 1987, Ser. No. 22,033
Int. Cl.[4] B66F 3/24
U.S. Cl. 254—93 R 12 Claims



1. Apparatus for unseating wire rope wedges from the wire rope connectors of drag line system and other heavy duty equipment wherein said wire rope connectors define a tapered socket within which is received a tapered wedge that secures an end of the wire rope within the wire rope connector, comprising:

(a) a housing adapted to be disposed about at least a portion of said wire rope connector;

(b) shoulder means within said housing positioned for restraining engagement with a portion of said wire rope connector;

(c) a transverse restraining pin supported by said housing and being positioned for restraining engagement with another portion of said wire rope connector; and

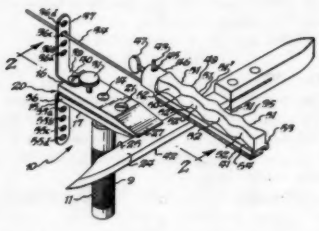
(d) power energized means supported by said housing and imparting an unseating force to said wedge and moving said wedge to said unseated position within said socket for release of wire rope disposed about said wedge.

4,714,239

SHARPENER MOUNTING CONSTRUCTION

Arthur L. LeVine, P.O. Box 800, Williamsville, N.Y. 14221

Division of Ser. No. 614,685, May 29, 1984, which is a division of Ser. No. 325,758, Nov. 30, 1981, Pat. No. 4,471,951. This application Mar. 7, 1986, Ser. No. 837,143
Int. Cl.[4] B24B 3/54
U.S. Cl. 269—3 5 Claims



1. A sharpener clamp construction for mounting on a mount-

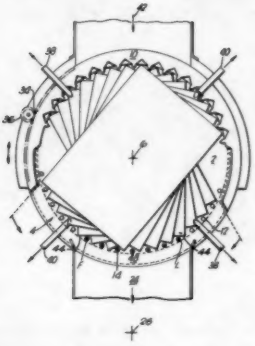
ing post comprising a sharpener body including first and second contiguous clamp members for clamping a knife, end portions on said first and second contiguous clamp members, first and second knife clamping means on said end portions of said first and second knife clamping members, respectively, inner and outer opposite sides on each of said first and second clamp members, said inner sides facing each other and said outer sides facing away from each other, first and second mounting post receiving bore means extending inwardly into each of said first and second clamp members, respectively, from said outer sides toward said inner sides for receiving the end of said mounting post for mounting said sharpener clamp construction on said end of said mounting post in two orientations 180° displaced from each other, and securing means for securing said first and second clamp members in assembled relationship.

4,714,240

LAMINA RETRIEVAL APPARATUS

Harry A. H. Spence-Bate, Morley, Australia, assignor to Joyce Florence Spence-Bate, Morley, Australia

Filed Jan. 29, 1986, Ser. No. 823,765
Claims priority, application Australia, Jan. 29, 1985, PG9069
Int. Cl.[4] B65H *3/30*
U.S. Cl. 271—3.1 **6 Claims**



1. A lamina retrieval device arranged to hold a stack of laminae in a fanned out angularly displaced disposition with each lamina lying flat on the adjacent lamina of the stack comprising

an axially elongate cage,

said cage including a plurality of elongate parallel guides extending in axial direction of the cage, said guides forming retention means for the stack each guide acting to retain the stack in its fanned out disposition by interposing between adjacent corners of the laminae of the stack,

at least some of said guides being movable to open said cage, and

removal means for removing a desired lamina from said stack.

4,714,241

RECIRCULATING DOCUMENT FEEDER

Kent A. Randall, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 4, 1986, Ser. No. 892,563
Int. Cl.[4] B65H *39/10*
U.S. Cl. 271—3.1 **1 Claim**

1. A document feeder for recirculating simplex or duplex document sheets to and from a scanning station of a reproduction apparatus for enabling selective production of pre-collated or post-collated simplex or duplex copies of simplex or duplex document sheets, said document feeder comprising:

means for holding a stack of document sheets;

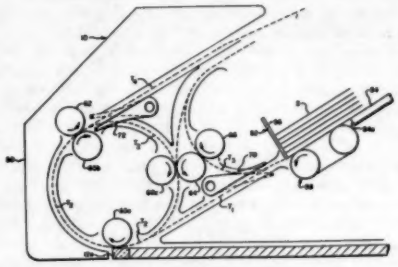
means for defining a first document sheet transport path in which a document sheet is moved from said stack holding means to said scanning station;

means for defining a second document sheet transport path in which a document sheet is moved in relation to said scanning station for scanning such document;

means for defining a third document sheet transport path in which a document sheet is turned over;

means for defining a fourth document sheet transport path in which a document sheet is moved from said second path defining means to said stack holding means;

first diverter means selectively movable to a first position for directing a transported document sheet from said first path defining means to said third path defining means, or



to a second position for directing a transported document sheet from said first path defining means to said second path defining means;

second diverter means selectively movable to a first position for retaining a transported document sheet in said second path defining means for recirculation past said scanning station, or to a second position for directing a transported document sheet from said second path defining means to said fourth path defining means; and

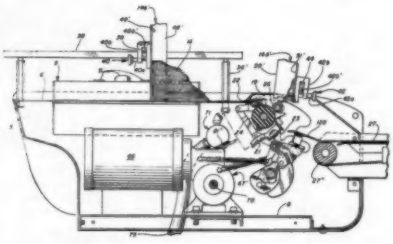
control means for positioning said first diverter means in its second position when document sheets are of the simplex type and in its first position when document sheets are of the duplex type, and for positioning said second diverter means in its second position when copies are to be made for post-collation and in its first position when copies are to be made for pre-collation.

4,714,242

SHEET FEEDING APPARATUS

Martin Selak, 578 S. Warrington Rd., Des Plaines, Ill. 60016

Filed Mar. 21, 1986, Ser. No. 842,622
Int. Cl.[4] B65H *3/08*
U.S. Cl. 271—100 **6 Claims**



1. In feeding apparatus including a horizontal support for a stack of sheets; stacking means for retaining on said horizontal support a vertical stack of sheet material, said horizontal sup-

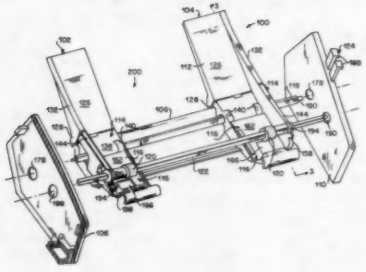
port terminating short of the front end of the stack to provide a feed opening exposing the front end portion of the bottom sheet in the stack; support ledge-forming means confronting said feed opening for supporting the weight of the front end of the stack of sheets; and means for withdrawing the front end portion of the bottommost sheet from the bottom of the stack through said feed opening and including suction cup means having a gripping plane for engaging the bottom surface of the exposed front end portion of the bottommost sheet in the stack and by force of suction pulling the same downwardly from the stack through the feed opening, a movable support structure for said suction cup means and including carrier means bodily movable between an initial lowered position to a raised position where the suction cup means carried thereby initially contact and then push upwardly against the exposed end portion of the bottommost sheet in the stack and suction cup mounting means upon which said suction cup means are directly supported, said mounting means being mounted for pivotal movement upon said carrier means so that the suction plane of the mouths of said suction cup means can be adjusted to different angles of inclination relative to said carrier means, and position control means for controlling the position and inclination of said mounting means on said carrier means by raising said carrier means to a position where the suction cup means on said mounting means initially engages the bottom surface of the bottommost sheet of the stack, with the suction plane thereof parallel to the sheet, then raising the same a small distance further while tilting said mounting means on said carrier means in a direction away from the said support ledge-forming means and without any substantial horizontal movement thereof away from said support ledge-forming means, and following which said carrier means is lowered to pull the front end of the bottommost sheet past said support ledge-forming means with a wiping contact thereof to withdraw only the bottommost sheet from the stack; the improvement wherein said position control means includes elevation adjusting means for manually progressively adjusting the peak elevation reached by said carrier means and the suction cup means carried thereby, and said position control means including stationary cam means against which a follower portion of said suction cup mounting means rides to vary the inclination of said mounting means relative to said carrier means, said follower portion engaging a different portion of said cam means as the elevation of said carrier means is varied.

4,714,243

PAPER TRAY FOR A PRINTING DEVICE

Tadeusz Staniszewski, Budd Lake, N.J., assignor to Ziyad Incorporated, Denville, N.J.

Filed Jan. 28, 1986, Ser. No. 823,472
Int. Cl.[4] B65H *1/00*
U.S. Cl. 271—171 **21 Claims**



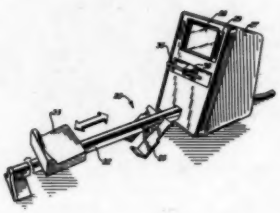
1. A paper tray for storing a stack of individual sheets of paper to be fed therefrom to a printing device, said paper tray comprising first paper supporting means for supporting one lateral portion of said stack, second paper supporting means for supporting another lateral portion of said stack, and a support guide movably supporting said first and second paper supporting means in spaced-apart relationship to accommodate stacks of individual sheets of paper having different widths between their lateral portions, said first paper supporting means including a first paper support having a first member and a second member paper support having a second member, said first paper support pivotally attached to said second paper support between a locked and unlocked position, said first member engaging said second member when said first paper support is in said locked position to prevent movement of said first paper supporting means along said support guide and said first member disengaging from said second member when said first paper support is in said unlocked position to permit movement of said first paper supporting means along said support guide.

4,714,244

ROWING MACHINE WITH IMPROVED MECHANICAL FEATURES

George Kolomayets; Allen Ryan, both of Chicago, Ill.; Augustine Nieto, Newport Beach, Calif., and Bryan Andrus, Chicago, Ill., assignors to Bally Manufacturing Corporation, Chicago, Ill.

Filed Apr. 4, 1986, Ser. No. 848,705
Int. Cl.[4] A63B *69/06*
U.S. Cl. 272—72 **8 Claims**



1. In a rowing exercise machine having a user interface means with a cable for accepting user exercising stroke movements, each stroke having a power and return portion, the machine further having a shaft, a cable drum carried on the shaft and adapted to have the cable unwound therefrom and rewound thereon to impart rotation to the shaft and to a flywheel connected to the shaft for receiving and conserving angular momentum imparted thereto, and means for opposing the rotational displacement of said flywheel, an improved user interface comprising:

a strain relief spring;

a stainless steel eye staked into one end of said spring, an end of said cable being staked into the opposite end of said spring;

a handle secured to said eye;

a cable port through which said cable extends from the drum to the handle, said cable port is made of nylon; said cable port also has a centrally located aperture therein with cross sections which are generally oval in shape to allow the cable to be pulled out from said port along a line generally parallel to the base or at an upward angle with respect to said line without rubbing against said port; said aperture has a sidewall a first portion of which lies in a first plane generally parallel to said base and a second portion which lies in a second plane at an angle with respect to said first plane wherein said first aperture sidewall portion guides the cable strait out of said cable port along said line and said second aperture sidewall portion guides the cable out of the port at an upward angle.

4,714,245

PIVOTAL SKIPPING ROPE HANDLES HAVING SPRING RESISTANCE

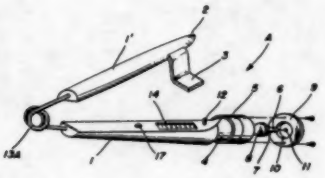
Myung H. Cho, 205-153, Cheongryang 2-Dong, Dongdaemoon-Ku, Seoul, Rep. of Korea

Division of Ser. No. 466,983, Feb. 15, 1983, Pat. No. 4,572,503. This application Aug. 2, 1985, Ser. No. 761,895

Claims priority, application Rep. of Korea, Jan. 17, 1983, 1983-329[U]

Int. Cl.[4] A63B *5/20, 21/30*

U.S. Cl. 272—75 3 Claims



1. A handle of a skipping rope comprising:

a first handle member being substantially semi-circular in cross section and having a first end, a gripping portion and a second end;

a second handle member being substantially semi-circular in cross section and having a first end, a gripping portion and a second end;

connecting means for pivotally connecting said first end of said first handle member to said first end of said second handle member, said connecting means being a coil spring having a first end operatively connected to said first end of said first handle member, and a second end operatively connected to a first end of said second handle member;

whereby said connecting means is additionally provided for biasing said handle members away from each other and for providing a resistance for an individual grasping said handle members and attempting to compress said handle members together;

supporting means rotatably mounted relative to the second end of at least one handle member, including means for attaching a jump rope to said at least one handle member; and

retaining means operatively mounted adjacent to the second end of said at least one handle member for retaining said first handle member relative to said second handle member and forming a substantially circular handle.

4,714,246

EXERCISE DEVICE

Pierre A. Parisien, 400 Stewart Ave., #704, Ottawa, Ontario, Canada K1N 6L2

Filed Oct. 2, 1986, Ser. No. 914,317

Int. Cl.[4] A63B *21/06, 59/00, 67/20*

U.S. Cl. 272—93 4 Claims

1. An exercise device consisting of a disk provided with two diametrically opposed handles to which disk is tethered at the center a resilient ball, the tether being of flexible but substantially inelastic material and of a length slightly shorter than the radius of said disk, thus allowing the ball to bounce back and forth against said disk, said ball being free to move in any

direction and to strike said disk at any point of contact within the limits imposed by the length of said tether.

4,714,247

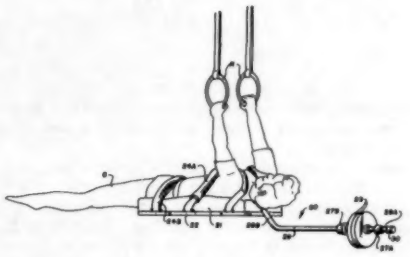
PLANCHE TRAINER

Siegfried H. Gerstung, 1306 Westellen Rd., Baltimore, Md. 21204

Filed Feb. 25, 1987, Ser. No. 18,479

Int. Cl.[4] A63B *7/00*

U.S. Cl. 272—109 10 Claims



1. A device for assisting a person to learn a gymnastic feat, comprising:

a board adapted to extend from the back of the person's neck to the lower end of the person's buttocks, said board having a front face;

a pad means, secured to the front face of the board for protecting the person's body from contact with the board;

a pole being secured to the board and having a portion extending beyond the board, said pole having a first portion adjacent to the board which is angled rearwardly from the board's front face and a second portion extending from said first portion generally parallel to the board; and

means, secured to the board, for harnessing the device to the person's body.

4,714,248

BASKETBALL RETURN DEVICE

Richard E. Koss, 3530 E. 8th Ave., Denver, Colo. 80206

Continuation-in-part of Ser. No. 761,320, Aug. 1, 1985. This application Jul. 7, 1986, Ser. No. 882,170

Int. Cl.[4] A63B *69/40*

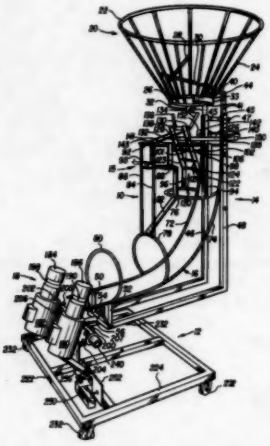
U.S. Cl. 273—1.5 A 6 Claims

4. A basketball return mechanism, comprising:

a lower support frame;

an upper support frame pivotally mounted on said lower support frame;

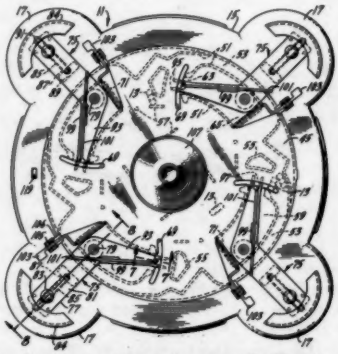
means for rotating said upper support frame with respect to said lower support frame;
ball receiving means attached to said upper support frame;
ball propelling means;
means for transporting a ball from said ball receiving means to said ball propelling means;
ball retaining means having a first position and a second position, said retaining means preventing passage of a ball from said ball receiving means to said ball transporting means with said retaining means in said first position and permitting passage with said retaining means in said second position;



means biasing said retaining means toward said first position;
actuator means for moving said retaining means to said second position;
means for detecting the position of a player relative to said basketball return mechanism, and for producing a first output signal upon detection of said player; and
control means responsive to said first output signal from detecting means, said control means operable to produce a second output signal in response to said first output signal, said second output signal causing said actuator means to move said retaining means to said second position.

4,714,249
ANTEATER GAME
Gordon A. Barlow, Glenview, Ill., assignor to Gordon Barlow Design, Skokie, Ill.
Filed May 7, 1987, Ser. No. 46,778
Int. Cl.[4] A63F *9/00*
U.S. Cl. 273—1 G **8 Claims**

1. A game including an annular plastic housing having a central opening extending from the top to the bottom thereof,
a rotatable disk located in the central opening,
means to rotate the disk in at least one direction of rotation,
a transparent cover mounted on the annular housing enclosing the top of the central opening,
the transparent cover positioned on the annular plastic housing a small distance above the rotatable disk to provide a raceway between the disk and the cover,
a plurality of walls depending from the transparent cover, with the walls terminating slightly above the rotatable disk,
the walls shaped to form pockets and flow paths as well as barricades for the pockets around the periphery of the cover,
a plurality of small, somewhat cylindrical plastic parts located on the disk to be moved through the raceway upon rotation of the disk,
each pocket having an inlet opening facing the direction of rotation of the disk and an outlet opening facing away from the direction of rotation of the disk,
means to open and close the outlet opening of each pocket, with said means normally being biased to an outlet closing position,
an arm swingable in an arc across a portion of the top of the cover installed at each pocket,



each arm having a guide portion normally biased to a position to block the entrance to its pocket, and
each guide portion having a pair of fingers positioned to receive one of the small, plastic cylindrical parts lengthwise and admit to the pocket when the guide is located at the entrance to its pocket.

4,714,250
GOLF BALL AND TEE SETTER
Clyde E. Henthorn, 4766 Echorock Dr., Columbus, Ohio 43229
Filed Sep. 6, 1985, Ser. No. 773,315
Int. Cl.[4] A63B *57/00*
U.S. Cl. 273—32.5 **6 Claims**

1. A remotely operable golf ball and tee setter which comprises:
a handle having an upper portion and a lower portion;
retaining means located about said lower portion and adapted to simultaneously retain a golf ball and tee in alignment for insertion of the tee into the ground, said retaining means being movable between an open position and a closed position, and being adapted to retain said ball and tee when in said closed position and to discharge said

ball and tee with said ball mounted on said tee when in said open position;

said retaining means includes first and second movable members;

pivotal mounting means for pivotally mounting said first and second members to said handle;

operating means for moving said retaining means between said closed position and said open position;

said operating means including first spring means applying a continuous equal force to each of said first and second movable members and acting to bias said retaining means toward said open position and to align said retaining means such that the axis of said handle is aligned with the axis of said ball and said tee; and

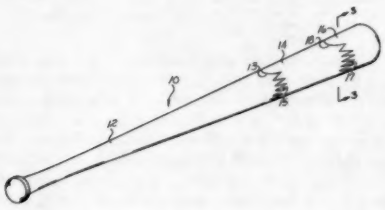
second spring means producing a force greater than said first spring means and acting to bias said retaining means toward said closed position.

4,714,251

BALL BAT

David C. Cook, Valparaiso, Ind., assignor to Thomas O. Cook, Orlando Park, Ill., a part interest

Filed Jan. 6, 1986, Ser. No. 816,320
Int. Cl.[4] A63B *59/06*
U.S. Cl. 273—72 R **5 Claims**



1. A ball bat comprising an elongated body which includes a handle end portion and a barrel end portion, said elongated body having a progressively decreasing cross sectional area from the barrel end to the handle end, said handle end portion formed of a light hard wood, said barrel end portion formed of a softer wood than the handle end portion, said body further including a portion intermediate said handle end portion and said barrel end portion, said intermediate portion formed of a heavy wood relative to said handle end light wood and barrel end soft wood, said handle end portion joined to said intermediate portion at one end thereof, said barrel end portion joined to an opposite end of said intermediate portion to form said bat body.

4,714,252

DUAL-WEIGHTED GOLF PUTTER HEAD

Harry G. Roraback, 55 Scenic Hill La., Monroe, Conn. 06468

Filed Nov. 20, 1986, Ser. No. 932,943
Int. Cl.[4] A63B *53/08*
U.S. Cl. 273—171 **7 Claims**

1. A golf putter head adapted to be mounted on a shaft having a handle to form a golf putter, the golf putter head comprising:

(A) an elongated strike plate defining a substantially flat face surface for striking a golf ball, the face surface extending from a toe end of the golf putter head to a heel end of the golf putter head;

(B) a sole extending rearwardly from the lower portion of the strike plate, the sole forming the lower portion and defining the bottom surface of the golf putter head;

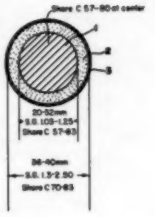
(C) a weighting means comprising solely a pair of spherical weights fabricated of a heavier material than the sole, one of the weights being mounted behind the strike plate near the toe of the golf putter head and the other of the weights being mounted behind the strike plate near the heel of the golf putter head said sole being convexly curved from the toe to the heel, and further defining hemispherical cavities for receiving the spherical weights, said cavities intersecting the bottom surface of the sole so that the weights are visible through the bottom surface of the putter head.

4,714,253

THREE-PIECE SOLID GOLF BALL

Akihiro Nakahara, Ibaraki, and Taketo Matsuki, Nishinomiya, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Continuation-in-part of Ser. No. 602,165, Apr. 19, 1984, abandoned. This application Sep. 10, 1985, Ser. No. 774,452
Claims priority, application Japan, Apr. 21, 1983, 58-70811
Int. Cl.[4] A63B *37/06*
U.S. Cl. 273—228 **6 Claims**



1. A three-piece solid golf ball having high durability and improved rebound characteristics which comprises a two-piece solid center made of a resilient elastomeric material having a central core and an outer layer, and a cover made of an impact and wear resistant material, wherein

(1) the central core has a diameter of 20 to 32 mm and a specific gravity of 1.03 to 1.25, with the center point of the central core having a hardness (Shore C) within the range of 57 to 80 with the center core, at a distance between 5 mm and 10 mm from its center point, having a shore hardness higher than that at the center point but not more than 83, and

(2) the outer layer has an outer diameter of 36 to 40 mm, a specified gravity of 1.30 to 2.50 and a hardness (Shore C) of 70 to 83.

4,714,254

BOARD GAME SIMULATING EDUCATIONAL METHODS INVOLVING SCHOOL OR COLLEGE CURRICULUMS

Danny L. Calloway, 3814-6 Chamberlayne Ave., Richmond, Va. 23227

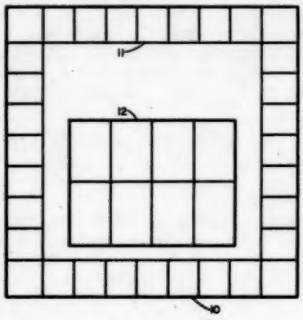
Filed Dec. 10, 1985, Ser. No. 807,443
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—249 **18 Claims**

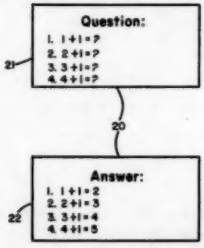
1. A board game apparatus comprising:

a playing board having an outer playing path and an inner playing path, said outer and inner playing paths being

separate and unconnected, said outer playing path comprising an endless arrangement of connected playing spaces, said inner playing path comprising a plurality of spaces representing classrooms;

a plurality of playing pieces for use by the players, said playing pieces comprising two playing pieces for each player, a first of said playing pieces being adapted to be placed on the outer playing path to indicate a player's position on that playing path and a second of said two playing pieces being adapted to be placed on the inner playing path to indicate a player's position on that playing path; a number selecting means for indicating the number of playing spaces in the outer path that a player is to move his playing piece;





a first set of cards having indicia thereon representing problems or questions to be solved by the players, said first set of cards representing tests;

at least some of said spaces on said outer playing path having indicia relating to said first set of cards such that when a player's playing piece lands on one of said spaces having said indicia therein, the player is directed to pick up one of said first cards representing tests;

said first set of cards being related to said inner playing path such that upon correctly solving the problem(s) or answering the question(s) contained thereon, a player can move his second playing piece to the next playing space on said inner path.

4,714,255

EDUCATIONAL BOARD GAME

Daniel P. Henry, 825 SE. 39th Ave.; Fredrick E. LaTorre, 5541 NE. 3rd Pl., both of Ocala, Fla. 32671, and Willard I. Pope, P.O. Box 5692, Ocala, Fla. 32678

Filed Jun. 10, 1986, Ser. No. 872,602

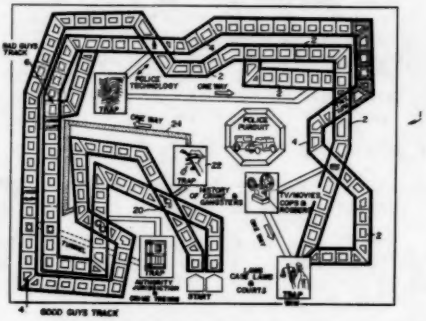
Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—249 **9 Claims**

1. An educational board game apparatus comprising:

(a) a pair of tokens each one representing one of the players;

(b) a game board with a multiplicity of consecutive playing sections arranged thereon, each of said playing sections having indicia thereon and arranged cooperatively to define a continuous first track and continuous second track, each of the tracks defining a path along which the tokens are moveable in random increments, the two tracks intersecting each other at a plurality of predetermined intersection points, each of the intersection points connected via a path to a retaining area and in turn a one way path leading back to the first or second track, each of the tracks including a starting space, a finishing space and as many different indicia as there are intersection points;



(c) a random number generating means for advancing the tokens around the game board from section to section; and

(d) a plurality of decks of cards, one deck per intersection point, each card in each deck having at least two levels of questions thereon of different levels of difficulty concerning the field of criminal justice, each of the cards of each deck identified by indicia common to the corresponding intersection point and distinct from the indicia on the cards of the other categories.

4,714,256

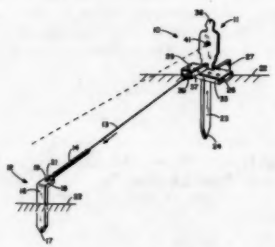
AUTOMATIC RESET TARGET ASSEMBLY

Kenneth J. Mosser, P.O. Box 242, Clarissa, Minn. 56440

Filed Jul. 28, 1986, Ser. No. 889,876

Int. Cl.[4] F47J *7/04*

U.S. Cl. 273—392 **22 Claims**



17. A target assembly comprising: target means adapted to be hit with a moving projectile, said target means including first means for anchoring the target means to a support, a movable member, second means connecting the movable member to the first means for movement between the first generally upright position and a second generally non-upright position, silhouette means attached to said member, said member normally holding the silhouette means in a generally upright position, and third means including an arm connected to the movable member, line means connected to the arm, and anchor means attached to the support remote from the target means connected to the line means, said line means including biasing

means for biasing the movable member and silhouette means to the normally upright position and allowing said silhouette means and movable member to move to a non-upright position when hit with a projectile.

4,714,257

ANNULAR SLIDING BODY FOR A SLIDING SEAL AND PROCESS FOR USE THEREOF

Juergen Heinrich, Schoenwald; Axel Krauth, Selb; Karl-Heinz Victor, Castrop-Rauxel, and Heinz Peeken, Aachen, all of Fed. Rep. of Germany, assignors to Hoechst Ceramtec Aktiengesellschaft and Pacific Wietz GmbH & Co. KG., both of, Fed. Rep. of Germany

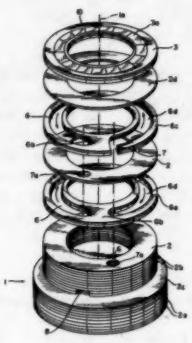
PCT No. PCT/EP83/00100, § 371 Date Dec. 9, 1983, § 102(e) Date Dec. 9, 1983, PCT Pub. No. WO83/03651, PCT Pub. Date Oct. 27, 1983

PCT Filed Apr. 8, 1983, Ser. No. 568,122

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1982, 3213378

Int. Cl.⁴ F16J *15/34*

U.S. Cl. 277—1 **41 Claims**



1. An annular sliding body for use in a sliding seal in which sliding surfaces of a sliding component and a counter component form a gap for fluid therebetween, said sliding body constituting one of said sliding component and said counter component and having a sliding surface on an axial face thereof formed by a thin flexible ceramic membrane layer, said sliding body further having arranged therein immediately beneath said flexible membrane layer at least one chamber extending only part way around the circumference of said sliding body and at least one radially extending solid portion supporting said membrane layer under part of the circumference of said sliding body; said membrane layer being elastically deformable above said chamber in a direction perpendicular to said sliding surface, so that a hydrodynamic effect may be produced.

35. A process for using a ceramic sliding body for a sliding seal having a sliding surface at one end formed by a flexible ceramic membrane covering at least one chamber in said body extending part way around the circumference of said body, said ceramic sliding body defining together with a counter component a gap in which there is a fluid, said process comprising elastically deforming said flexible ceramic membrane in a direction perpendicular to said sliding surface to produce a hydrodynamically enhanced spacial form on the sliding surface.

4,714,258

BALANCED ROTARY SEAL ENSURING TIGHTNESS OF A HYDRAULIC TURBINE SHAFT

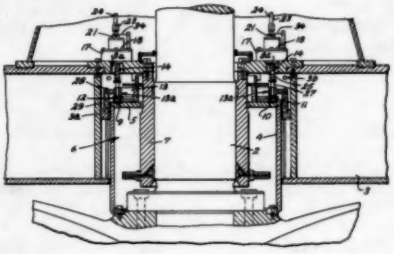
Albert Sauron, 6 Rue des Moissons, 38170 Seyssins, and Alexandre Smetanine, 20 Place Louis Jouvet, 38100 Grenoble, both of France

Filed Jan. 28, 1986, Ser. No. 823,428

Claims priority, application France, Feb. 1, 1985, 85 01603

Int. Cl.⁴ F01D *25/18*; F16J *15/34*

U.S. Cl. 277—72 R **9 Claims**



1. A seal assembly for sealing a rotary driven shaft having rotary driven components movable therewith from adjacent non-rotating components and wherein an annular erodable wearing plate is movably carried by the rotary driven components so as to be oriented in surrounding relationship to the drive shaft, the seal assembly comprising a pair of concentric annular seal means, holder means for supporting said annular seal means against the annular wearing plate so as to create an annular space between said annular seal means which is in fluid communication with the wear plate, a plurality of fluid conveying means oriented about the rotary driven shaft, means for connecting each of said fluid conveying means to said holder means so as to be in communication with said annular space between said annular seal means, a first force applying means for selectively urging said holder means and said annular seal means against the annular wear plate, second counteracting force means operably connected to adjust the movement of said holder means, said second couteracting force means limiting the movement of said holder means and said annular seal means against the wear plate by counteracting the pressure applied thereto by said first force applying means, and means for supplying fluid through said fluid conveying means so as to lubricate and cool the area of contact between said annular seal means and the wear plate.

4,714,259

SEALING RING STRUCTURE WITH STRESSING RING

Theo Mack, Leinfelden-Echterdingen, and Roy Edlund, Stuttgart, both of Fed. Rep. of Germany, assignors to Busak + Luyken GmbH & Co., Fed. Rep. of Germany

Filed Apr. 16, 1987, Ser. No. 38,956

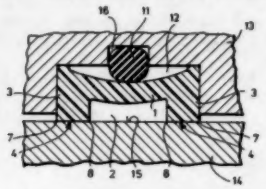
Claims priority, application Fed. Rep. of Germany, Apr. 24, 1986, 3613880

Int. Cl.⁴ F16J *15/24*

U.S. Cl. 277—165 **6 Claims**

1. Sealing ring structure comprising a sealing ring made of a tough-elastic plastic material fitted into the groove of one of two machine elements moving relative to each other, and a stressing ring made of a rubber-elastic material arranged between the said sealing ring and the bottom of the groove and loading the sealing ring in the radial direction, the axial extension of the said stressing ring being considerably smaller than that of the sealing ring and its axial position, relative to the sealing ring, being fixed by means of stops in such a manner that the sealing ring is loaded in the area of an edge, wherein

that sealing surface of the said sealing ring which rests against the other machine component comprises an annular recess and



the said stressing ring is arranged approximately centrically relative to the said recess.

4,714,260

STEEL LAMINATE GASKET

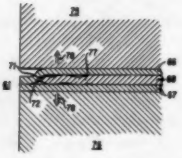
Tsunekazu Udagawa, Ichikawa, Japan, assignor to Ishikawa Gasket Co. Ltd., Tokyo, Japan

Filed Feb. 24, 1987, Ser. No. 18,222

Claims priority, application Japan, Jun. 26, 1986, 61-096713[U]

Int. Cl.[4] F16J *15/08*

U.S. Cl. 277—235 B **8 Claims**



1. A steel laminate gasket for an internal combustion engine having at least one hole therein;

a first plate having at least one first hole corresponding to the hole of the engine and at least one first inner portion around the first hole,

a second plate having at least one second hole corresponding to the hole of the engine, at least one second inner portion situated around the second hole and abutting against the first plate, at least one curved portion extending radially outwardly from the second inner portion relative to the second hole and extending diagonally relative to the second inner portion, and an outer portion extending outwardly from the curved portion parallel to the second inner portion, and

at least one middle plate situated between the first and second plates, said middle plate having at least one third hole slightly larger than the first and second holes, at least one inner edge formed around the third hole, said inner edge being situated adjacent to the curved portion, at least one bead formed around the third hole adjacent the inner edge, and an outside portion formed outside the bead, said middle plate, when the gasket is compressed, actuating so that the inner edge abuts against the curved portion of the second plate to allow the bead to form strong sealing pressure thereat.

4,714,261

STEERING WHEEL FIXING CONSTRUCTION FOR TOY VEHICLES

Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

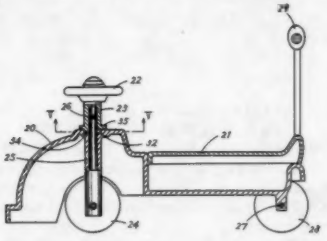
Filed Aug. 25, 1986, Ser. No. 899,809

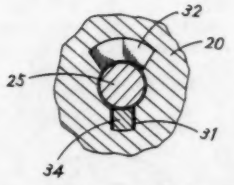
Claims priority, application Japan, Aug. 29, 1985, 60-132549[U]

Int. Cl.[4] B62K *5/08*; B62M *1/00*

U.S. Cl. 280—7.1 **1 Claim**

1. A steering wheel fixing construction for a toy vehicle, comprising a front wheel support rod rotatably supporting front wheels, said support rod having a rod portion projecting beyond an upper surface of a toy body, said projecting rod portion being adapted to removably receive a sleeve which is integral with a steering wheel, said toy body having a portion of its upper surface extending around said front wheel support rod, said body portion having a relatively narrow groove and a relatively wide groove, said sleeve comprising an engaging





projection sized to snugly fit in said narrow groove, the arrangement being such that said engaging projection can be selectively positioned in said narrow groove or said wide groove, said sleeve having an uninterrupted flange with a diameter sufficient for covering said engaging projection, said wide groove, and said narrow groove, said flange resting on said upper surface of said toy body for preventing an injury to a user of said toy vehicle by said engaging projection.

4,714,262

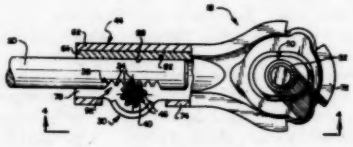
VARIABLE LENGTH TIE ROD ASSEMBLY

Ruey E. Wood, St. Clair Shores, Mich., assignor to TRW Inc., Lyndhurst, Ohio

Filed Jun. 17, 1986, Ser. No. 875,104

Int. Cl.[4] B62D *7/16*

U.S. Cl. 280—95 R **3 Claims**



1. An assembly comprising:

a tie rod having an end portion with teeth formed thereon;

a ball and socket assembly comprising a ball stud and a socket housing, said socket housing having a first housing portion for receiving said ball stud and a second housing portion for receiving said end portion of said tie rod;

a pinion having a plurality of teeth for engaging said teeth formed on said end portion of said tie rod and rotatable to effect relative axial movement between said socket housing and said tie rod;

said second housing portion having means for supporting said pinion for rotation relative thereto to effect said relative axial movement between said socket housing and said tie rod; and

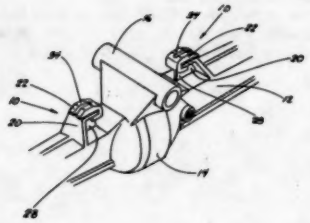
means disposed adjacent opposite axial ends of said pinion for applying force against opposite portions of said second housing portion to press said opposite portions of said second housing portion against said tie rod to hold said tie rod against axial movement relative to said socket housing and to simultaneously lock said pinion against rotation, said force applying means being releasable to relieve said opposite portions of said second housing portion from pressing on said tie rod and to enable rotation of said pinion to effect axial adjustment between said tie rod and said socket housing.

4,714,263

AXLE OSCILLATION ADJUSTMENT MEANS

Donald C. Marek, Hickory Hills, Ill., assignor to J. I. Case Company, Racine, Wis.

Filed Sep. 17, 1986, Ser. No. 908,391
Int. Cl.[4] B60G *11/22, 11/00, 25/00*
U.S. Cl. 280—111 **19 Claims**



1. In a tractor of the type having a tractor body, an axle tiltable about a center point with respect to the tractor body, and means on either side of the center point for limiting the range of axle tilting, the improvement wherein each limiting means comprises:

a fixed bolster secured to the tractor body in position above the axle;

a base fixed with respect to the axle, projecting upwardly therefrom, and having a first top abutment surface vertically aligned with and engagable with the bolster; and

a mounted member removably securable to the base in a working position and having a second top abutment surface which is above the first top abutment surface when the mounted member is in the working position,

whereby the second abutment surface restricts oscillation of the axle more than the first abutment surface.

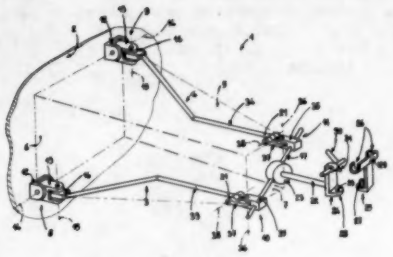
4,714,264

COUPLING STRUCTURE BETWEEN A TOWING VEHICLE AND A TOWED VEHICLE

Emile Woestelandt, 180 Rue Du Gal de Gaulle, 59370 Mons En Baroeul, France

Filed Apr. 25, 1986, Ser. No. 855,713
Claims priority, application France, Apr. 26, 1985, 85 06808
Int. Cl.[4] B60D *1/14*
U.S. Cl. 280—456 R **23 Claims**

1. A coupling structure adapted to be used between a towing vehicle and a towed vehicle to damp drifting motions, such as yawing and pitching, of the towed vehicle relative to the towing vehicle, said coupling structure comprising only two real arms (3, 4) located substantially along diagonally opposed corners of an imaginary truncated pyramid (5) having imaginary spaced rectangular bases (6, 7), a first imaginary rectangular base (6) being larger than a second imaginary rectangular base (7), the rectangular bases having imaginary sides which are disposed to be substantially horizontal and vertical, said two real arms (3, 4) further being disposed substantially along two diagonally opposed edges of an imaginary pyramid having a vertex at a point located near a rear axle of the towing vehicle, said real arms being articulated at points both on the towed



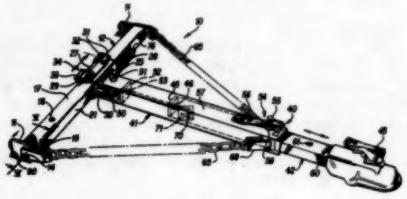
vehicle (2), at two diagonally opposed vertices (8, 9) of the large base (6), and at an end nearest the towing vehicle at of two diagonally opposed vertices (10, 11) of the small base (7) of the imaginary truncated pyramid.

4,714,265

AUTOMATICALLY ALIGNED TOW BAR HITCH

John N. Franklin, 9 Fairway Ave., Iola, Kans. 66749

Filed Apr. 7, 1987, Ser. No. 35,177
Int. Cl.[4] B60D *1/14*
U.S. Cl. 280—491 D **16 Claims**

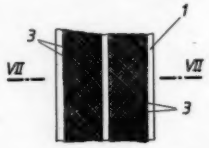


1. A tow bar apparatus which is mounted to a trailing vehicle for use in connecting the trailing vehicle to a towing vehicle and wherein the towing vehicle is provided with a point of connection extending from the rear end thereof, comprising a cross bar means having opposite ends and a central portion, bracket means for mounting said cross bar means to the trailing vehicle so as to be positioned generally forwardly with respect thereto, slide means movably supported with respect to said cross bar means between a first position adjacent one of said ends of said cross bar means and a second position generally along said central portion of said cross bar means, a hitch bar assembly having a first portion and a second portion slidably extended with respect to and generally axially of said first portion, pivot means for mounting said hitch bar assembly to said slided means, hitch means connected to said second portion of said hitch bar assembly, cable means having first and second end portions and an intermediate portion, means for connecting said first end portion of said cable means to said second portion of said hitch bar assembly, second means for securing said second end of said cable means to said cross bar means, and means for engaging said intermediate portion of said cable means with said slide means whereby as said second portion of said hitch bar assembly is urged outwardly with respect to said first portion thereof, said cable means will urge said slide means into said second position generally centrally of said cross bar means.

4,714,266
SKI RUNNING-SURFACE PLASTIC COATING

Werner Feichtlbauer, Antiesenhofen, Austria, assignor to Trak Incorporated, Wardhill, Mass.

Filed Oct. 7, 1985, Ser. No. 785,568
Claims priority, application Austria, Oct. 9, 1984, 3188/84
The portion of the term of this patent subsequent to Jan. 21, 2003, has been disclaimed.
Int. Cl.[4] A63C 5/00
U.S. Cl. 280—604 12 Claims

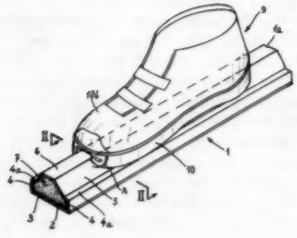


1. In a running-surface plastic coating for a ski which comprises a running surface forming a climbing aid and having a multiplicity of teeth which are aligned in the longitudinal direction of the ski and terminate toward the rear end of the ski in a pointed end capable of being bent upwards, said teeth being defined by two families of parallel spaced-apart running-surface cuts intersecting each other in the running surface, the individual families of cuts being inclined to a normal of the running surface in opposite directions, the improvement wherein the running surface cuts at least substantially have the shape of circular segments and include an angle of at least 60° with a running-surface normal, and that the relative spacing of the running-surface cuts is at most 1 mm.

4,714,267
CROSS COUNTRY SKI ASSEMBLY

Roger Abondance, Rives; Pierre Corbet, Grenoble; Francois Jodelet, Voiron, and Jean-Francois Andre, Voiron, all of France, assignors to Skis Rossignol S.A., Voiron, France

Filed May 28, 1985, Ser. No. 738,552
Claims priority, application France, May 29, 1984, 84 08813; Feb. 19, 1985, 85 02989
Int. Cl.[4] A63C 9/20
U.S. Cl. 280—615 23 Claims



1. A cross-country ski assembly, comprising:

a cross-country ski constituted of a ski body formed with:

a bottom surface for engagement with snow,

a ridge unitary with said body and extending over substantially the entire length of the ski and over a major portion of the width thereof and defining the top of the ski, and

a pair of longitudinal flanks laterally bounding the ski while extending upwardly from said bottom surface to substantially the level of a bottom of said ridge,

said ridge comprising:

an upper surface substantially parallel to said bottom surface, and

a pair of oblique faces diverging downwardly and outwardly from said upper surface to the bottom of said ridge;

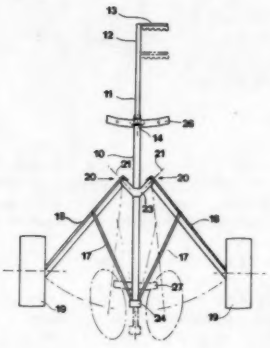
a boot member adapted to receive a foot of a skier and having a sole formed with a longitudinal groove extending continuously from a toe to the heel of said boot member and complementary in shape to that of said ridge and adapted to rest upon said ridge over the entire length of said sole; and

means at a front end of said member defining a pivot axis coupling said member to said ski body, said pivot axis extending through said ridge transversely of said ridge below said upper surface and above said bottom of said ridge and said longitudinal flanks.

4,714,268
FOLDING GOLF CART

Graham W. Mather; Graham R. Warwick, both of Coventry, and Graham A. Bazeley, Bedworth, all of England, assignors to Fisherwell Limited, England

Continuation of Ser. No. 833,117, Feb. 26, 1986, abandoned.
This application Mar. 23, 1987, Ser. No. 29,047
Claims priority, application United Kingdom, Feb. 26, 1985, 8504925
Int. Cl.[4] B62D 3/04
U.S. Cl. 280—646 5 Claims



1. A folding golf cart having an open support position and a folded position comprising:

a single frame member having a central longitudinally extending hollow stem;

golf bag support means connected to said stem for supporting a golf bag on the cart;

a handle member telescopically carried in said stem, an upper end of said handle member projecting upwards beyond a first end of said stem and having a handle to be grasped, a second opposite end of said handle member projecting downwards beyond a lower opposite end of said stem and having a mounting mechanism, said mounting mechanism being engageable with the ground for supporting the cart when the cart is in said support position;

wheel support arms pivotally connected with respect to said stem and extending on opposite sides of said stem for motion between a laterally extending support position and a folded position adjacent said stem;

a wheel rotatably supported by each of said support arms; and

folding means for moving said support arms between said support and folded positions, said folding means being coupled between each of said support arms and said mounting mechanism so that telescopic movement of said

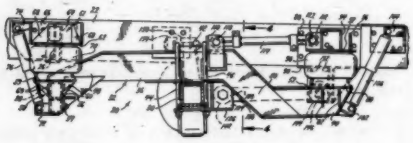
handle member along the length of said stem moves said support arms between the support position wherein said wheels are laterally spaced from one another with said mounting mechanism being in engagement with the lower end of said stem for supporting the cart in a stable manner and the folded position wherein said wheels are adjacent said stem to reduce the size of the cart for transportation.

4,714,269

WIDE BASE TYPE SUSPENSION ASSEMBLY WITH PARALLELOGRAM TORQUE BEAMS AND FOUR AIR SPRINGS

John E. Raidel, Rt. 1, Box 400-M, Springfield, Mo. 65804

Filed Nov. 18, 1986, Ser. No. 931,808
Int. Cl.[4] B60G *3/16, 11/26*
U.S. Cl. 280—683 **7 Claims**



1. A vehicle suspension system for a vehicle having a chassis that includes a longitudinally extending frame rail member and an axle spaced below the frame rail member, comprising a longitudinally extending beam assembly having forward and rearward ends and a medial section therebetween, means to connect the medial section to the axle at a location that positions the beam assembly below and outboard of the frame rail member, a front air spring and a rear air spring, means to support the bottom of the rear air spring from the rearward end of the beam assembly, means to support the top of the rear air spring from the frame rail member, means to support the bottom of the front air spring from the forward end of the beam assembly, means to support the top of the front air spring from the frame rail member, an upper torque rod having a forward end and a rearward end, a lower torque rod having a forward end and a rearward end, front bracket means supported by the medial section of the beam assembly and having upper and lower connectors, the lower connector being positioned inboard of the upper connector and of the beam, rear bracket means supported by the frame rail member at a location adjacent the rear air spring and having upper and lower connectors, the lower connector of the rear bracket means being positioned inboard of the upper connector of the rear bracket means, bushing means to pivotally connect the forward and rearward ends of the upper torque rod to the upper connectors of the front and rear bracket means respectively, and relatively large bushing means to pivotally connect the forward and rearward ends of the lower torque rod to the lower connectors of the front and rear bracket means respectively to provide a longitudinal parallelogram defined by the torque rods, the lower torque rod being substantially larger in cross-sectional area than the upper torque rod to accomodate the relatively large bushing means and to provide push and pull force transmission through the lower torque rod.

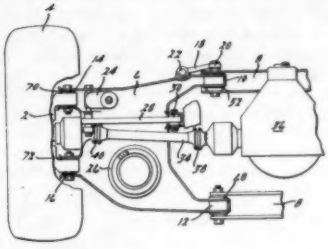
4,714,270

INDEPENDENT WHEEL SUSPENSION WITH TOE CORRECTING LINK

Manfred Rumpel, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 18, 1985, Ser. No. 789,229
Int. Cl.[4] B60G *5/00*
U.S. Cl. 280—690 **16 Claims**

1. A suspension system for motor vehicle comprising:
a wheel carrier;
a roadwheel and tire assembly rotatably mounted to said wheel carrier
a control arm pivoted at one end to the chassis of said vehicle at two locations separate longitudinally from each other and pivoted at a second end to said wheel carrier at two locations separated longitudinally from each other; and



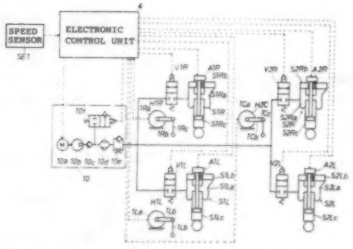
means operatively associated with said control arm and responsive to recession of said control arm for displacing said control arm such that said control arm will urge said roadwheel and tire assembly in the direction of toe-in, with said means causing said control arm to rotate in a horizontal plane about one of said pivots connecting said control arm to said chassis, while moving transversely with respect to the other of said pivots connecting said control arm to said chassis.

4,714,271

SUSPENSION CONTROLLER

Shuuichi Buma, Toyota; Toshio Onuma, Susono; Kaoru Ohashi, Okazaki, and Masami Itou, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Oct. 8, 1986, Ser. No. 916,721
Claims priority, application Japan, Oct. 26, 1985, 60-239776
Int. Cl.[4] B60G *9/00*
U.S. Cl. 280—707 **12 Claims**



1. A suspension controller for a vehicle having variable suspension means for controlling a distance between a body and a wheel axle of said vehicle, said controller comprising:
vehicle height detection means for providing a vehicle height signal representative of said distance;
vehicle speed detection means for providing a vehicle speed signal representative of a vehicle speed;
vehicle height determination means for providing a first soft signal indicative of an alteration of said variable suspension means to a soft state when a change in said vehicle height signal within a predetermined period exceeds a predetermined value and said vehicle speed signal is within a predetermined speed range, said predetermined period being set such that said variable suspension means maybe altered before a rear wheel of said vehicle moving

at said predetermined speed range reaches a front wheel position thereof;

vehicle speed determination means for providing a hard signal representative of alteration of said variable suspension to a harder state when said vehicle speed signal exceeds a first reference speed signal and for providing a second soft signal representative of alteration of said variable suspension to softer state when said vehicle speed signal is less than a second reference speed signal which is set to be less than said first reference speed signal; and

preference means responsive to said vehicle height determination means and said vehicle speed determination means for providing a preference for said first soft signal to said suspension means over said hard signal and said second soft signal when said vehicle speed signal is within an overlapped range in which said predetermined speed range overlaps a range between said second reference speed and said first reference speed.

4,714,272

SUSPENSION CONTROLLER

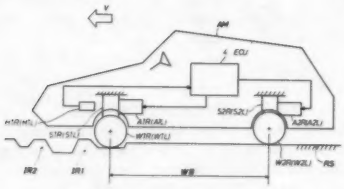
Shuuichi Buma, Toyota; Toshio Onuma, Susono; Kaoru Ohashi, Okazaki, and Masami Itou, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Sep. 24, 1986, Ser. No. 910,977

Claims priority, application Japan, Oct. 2, 1985, 60-221658

Int. Cl.[4] B60G *11/26*

U.S. Cl. 280—707 **12 Claims**



1. A suspension controller for a vehicle comprising:

front vehicle height detection means for detecting a vehicle height at a front wheel and for generating a vehicle height signal;

determination means for deriving vehicle height data from the vehicle height signal, for determining if a difference between a maximum and minimum of the vehicle height data during a predetermined period is greater than a reference value, the predetermined period being shorter than a cycle time of a resonant vibration of an unsprung mass of the vehicle, and for generating a determination signal when the difference is greater than the reference value; and

suspension characteristic alteration means responsive to the determination signal for alternating a suspension characteristic at the rear wheel of the vehicle before the rear wheel reaches a position at which the difference has been determined to be greater than the reference value.

4,714,273

VEHICLE FOR TRANSPORTING ELONGATED OBJECTS

Melvin P. Kejr, 1704 Cloud Cir., Salina, Kans. 67401

Filed Jan. 6, 1986, Ser. No. 816,239

Int. Cl.[4] B60P *1/02*

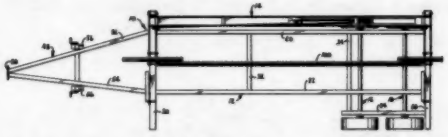
U.S. Cl. 280—789 **5 Claims**

1. A vehicle for transporting elongated objects, said vehicle comprising:

a horizontally extending, elongated bed including at least one longitudinally extending intermediate member and a longitudinally extending side member spaced laterally from said intermediate member, and front and rear cross members secured to said intermediate member and to said one side member;

wheel and axle means secured to the bed for supporting the latter;

an upright, rigid frame carried by the bed adjacent only one side of the latter extending longitudinally of the bed and including frame components extending upwardly from the bed, the opposite side of the bed being unobstructed by upwardly extending frame components, the bed including a longitudinally extending side member on said opposite side which is substantially shorter than the intermediate member and other side member;



a purality of arms carried by the frame and cantilevered over the bed; and

power means for selectively raising said arms relative to the bed to lift an object resting on said arms to a position spaced vertically of the bed to placement of another object on the bed, the relatively short side member providing clearance at the side of the vehicle for the unobstructed raising and lowering of auxiliary lifting apparatus for placing the objects on the arms and bed respectively from the unobstructed side of the bed.

4,714,274

SEAT BELT RETRACTOR

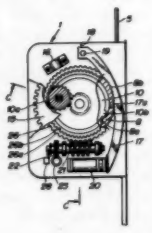
Hideyuki Nagashima, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed May 19, 1986, Ser. No. 864,484

Claims priority, application Japan, May 23, 1985, 60-109246

Int. Cl.[4] B60R *21/10*

U.S. Cl. 280—801 **8 Claims**



8. A seat belt retractor for use in a motor vehicle comprising:

a housing;

a belt take-up shaft rotatably mounted to said housing;

biasing means for biasing said take-up shaft in a belt retracting direction to retract a seat belt;

a tensionless means for causing the seat belt to assume a tensionless state wherein said take-up shaft is prevented from rotating in the belt retracting direction;

a motor actuated slack control means for rotating said belt take-up shaft;

first output means for controlling said tensionless means and said motor actuated slack control means so as to provide the seat belt in a first set position in a tensionless state with a desired slack;

belt position memory means;

means for storing in said memory means a first signal representing the first set position;

belt position detecting means for outputting a second signal

representative of a newly set position of the seat belt when the vehicle is ready for reverse driving;

means for storing the second signal in said memory means;

second output means for actuating said tensionless means based on the second signal from said memory means so as to cause the seat belt in the newly set position to assume the tensionless state; and

means for actuating said biasing means, tensionless means, and motor actuated slack control means based upon said first signal from said memory means to retract said belt to said first set position in a tensionless state after completion of reverse driving.

4,714,275

TOY STICKER COLLECTION ALBUM AND COLLECTIBLE STICKERS THEREFOR

James E. Engel, Lombard, and Sidney Diamond, Chicago, both of Ill., assignors to Diamond Publishing, Niles, Ill.

Filed Oct. 27, 1986, Ser. No. 923,764

Int. Cl.[4] B42D *1/00*; G09F *1/10*; G02B *27/22*; G09B *11/06*

U.S. Cl. 281—15 R **15 Claims**

1. A toy picture collection album, comprising:

an album including a front cover, a back cover and a plurality of pages secured between said front cover and said back cover,

each page of said plurality of pages includes at least one image, each said image being of at least one first color,

a pattern covering each said image, said pattern being of at least one second color,

a filter, said filter including a sheet of transparent film, said film tinted said second color, and

a collectible item, said collectible item including first and second sides, said first side including an illustration corresponding to said at least one image, means on said second side for securing said collectible item on to one of said plurality of pages over said at least one image.

4,714,276

MULTIPLE-PART FORM WITH ONE OR MORE PARTS REMOVABLY RETAINED BY TEMPORARY ADHESION IN STUB AREA

Walter G. Greig, Lewiston, N.Y., assignor to Moore Business Forms, Inc., Glenview, Ill.

Filed Sep. 25, 1986, Ser. No. 911,411

Int. Cl.[4] B32B *7/06*, *7/10*, *7/12*

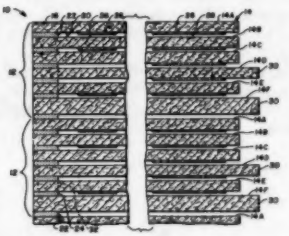
U.S. Cl. 283—63 R **5 Claims**

1. A preprinted form pad, comprising:

a stack of two-sided sheets preprinted on one side with at least one of verbal and non-verbal indicia, said sheets being grouped serially by set in at least one set, each set being comprised of a plurality of said sheets;

said preprinted indicia on at least two of said sheets in each set differing from sheet to sheet;

each said sheet being serially connected to neighboring said sheets in said stock along at least one respective margin of each, at least one of such connections in each set being by means of a strip of non-drying, lightly tacky pressure-sensitive adhesive which is adapted to permit each respective sheet bearing such adhesive to be easily peeled free of the respective underlying said sheet and temporarily adhered by such adhesive to another surface, and at least another



of such connections in each set being by means of a strip of permanent adhesive.

4,714,277

LONGITUDINALLY DIVIDED SLEEVE OF SHRINKABLE MATERIAL

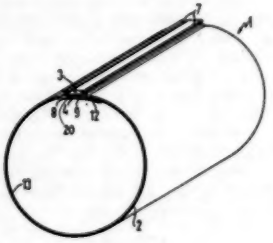
Ernst Bachel, Geltendorf, and Wolfgang Giebel, Planegg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 24, 1986, Ser. No. 855,354

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515242

Int. Cl.[4] F16L *47/00*

U.S. Cl. 285—39 **11 Claims**



1. In a longitudinally divided sleeve of shrinkable material comprising a lock closure along longitudinal edges, said lock closure comprising one longitudinal locking groove along one edge and one lock element mating with said groove along a second longitudinal edge, the improvements comprising the region of the closure having a higher degree of cross-linking than the remaining shrinkable portions of the sleeve, said longitudinal locking groove along said one longitudinal edge being formed by two longitudinally extending legs inclined toward one another to form the longitudinal locking groove having a narrower mouth than base, said lock element along the second longitudinal edge being provided with a longitudinally hook-shaped part having an angle of inclination matched to the angle of inclination of one of said pair of legs forming the one longitudinal locking groove, said lock element including a resilient projection at its end, said projection protruding along the base of the locking groove and coacting with the hook part to match the width of the base of said locking groove so that when the hook is inserted into the longitudinal locking groove, the resilient projection prevents unintentional removal of the hook part from said groove.

4,714,278
PLASTIC PART PROVIDED WITH A METAL THREADED ELEMENT

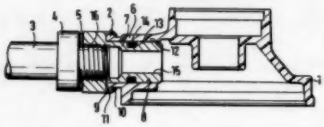
Heiner Gassmann, Esslingen; Siegfried Beck, Stuttgart, and Werner Heinlein, Wiernsheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 170,225, Jul. 18, 1980, abandoned. This application Apr. 15, 1986, Ser. No. 852,385

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1979, 2937443

Int. Cl.⁴ F16L *55/00*

U.S. Cl. 285—169 **5 Claims**



1. A plastic housing cover for a valve, said cover including an open upper end and an open base of larger diameter than said upper end which open base seats upon said valve to cover said valve, said cover further including an integral connector sleeve formed as a unitary part of said cover outwardly therefrom and including a cylindrical bore therein, said connector sleeve having a connector end with a radially extending shoulder, a metal nipple having a passage therethrough with threads on an inner surface of one end of said passage, said nipple having a first nonthreaded outer cylindrical end portion radially outwardly of said threaded end of said passage, said first nonthreaded outer cylindrical end portion having a diameter which is greater than the diameter of said radially extending shoulder of said connector end of said connector sleeve, said nipple including a second cylindrical end portion having an outer diameter smaller than said first cylindrical end portion and substantially the same diameter as said bore of said connector sleeve for securing said second cylindrical end portion of said nipple in said bore of said connector sleeve and for connecting a fluid pressure line connected to said threaded end of said nipple to said connector end of said connector sleeve, further wherein said connector sleeve is cylindrical and arranged to receive said second end portion of said threaded metal nipple in a sealing fashion, and a seal means between said second end portion of said threaded metal nipple and said connector sleeve for assuring a seal therebetween.

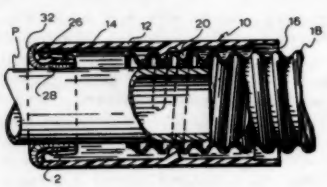
4,714,279
EXHAUST PIPE COUPLER

Lincoln Custeau, 404 Notre-Dame Sud, Robertsonville, Quebec, Canada G0N 1L0

Filed Nov. 3, 1986, Ser. No. 925,963

Int. Cl.⁴ F16L *33/00*

U.S. Cl. 285—239 **12 Claims**



1. A coupler for releasably connecting an evacuation hose to the exhaust pipe of a motor vehicle, comprising a cylindrical body having one end adapted to be sealingly connected to one end of said evacuation hose and a flexible annular wall partially closing the other end of said body, a central hole defined by said annular wall having a diameter which is smaller than the minimum diameter of the exhaust pipe to be fitted within said body, the internal diameter of said body being larger than the maximum diameter of an exhaust pipe to be fitted within said body, said annular wall having radial slits extending therethrough and to said hole to define generally sector-shape flexible resilient flaps, and further including spaced first spacer members protruding from the exterior face of said flaps wherein when said body is slipped onto an exhaust pipe the flaps are bent inwardly and said spacer members frictionally engage said exhaust pipe whereby said first spacer members define air channels therebetween and between said flaps and the exterior wall of said exhaust pipe, said air channels operatively interconnecting the interior of said cylindrical body with exterior ambient air for free through-flow ventilating circulation of air substantially longitudinally of said exhaust pipe.

4,714,280
HEAT-SHRINKABLE CONNECTION COMPRISING A VARIABLE CHANNEL AND A COOPERATING ELEMENT

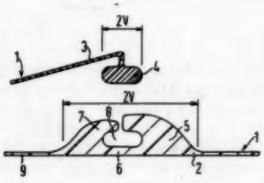
Hans Winterhoff, Hagen, Fed. Rep. of Germany, assignor to RXS Schrumpftechnik-Garnituren GmbH, Fed. Rep. of Germany

Filed May 16, 1986, Ser. No. 863,859

Claims priority, application Fed. Rep. of Germany, May 17, 1985, 3517857

Int. Cl.⁴ F16L *47/00*

U.S. Cl. 285—381 **16 Claims**



1. A heat-shrinkable connection having heat-deformable connecting elements composed of an axially elongated channel and of a cooperating element thickened at its end, comprising the improvement wherein said channel is composed of a pair of opposed, longitudinally elongated and continuous leg parts, which have dimensioned stability under the application of heat, and of at least one shrink region, being a floor of said channel formed integrally with said leg parts, said shrink region being laterally shrinkable to cause said opposed leg parts to move towards each other to engage said cooperating element in a positively locking fashion under the application of heat.

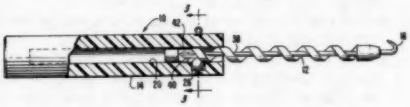
4,714,281
DEVICE AND METHOD FOR TYING A TWISTED CLINCH KNOT

Richard M. Peck, 3113 Club Dr., Allentown, Pa. 18103

Filed Jan. 2, 1987, Ser. No. 178

Int. Cl.⁴ B65H *69/04*

U.S. Cl. 289—1.5 **15 Claims**



1. A hand-held device for tying a twisted clinch knot com-

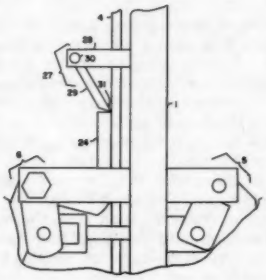
prising a worm shaft, a handle defining a recess shaped to receive said shaft, a first stop means for determining a forwardmost position of said shaft relative to said handle and for retaining a first end of said shaft within said handle, a securing means disposed on a second forward end of said shaft for securing an article to which said knot is to be tied, and a protrusion disposed on an interior wall of said handle that is received within threads of said shaft, wherein said protrusion is maintained in a substantially stationary position relative to said handle and causes said worm shaft to rotate as it moves from a rearward position, relative to said handle, toward said forwardmost position.

4,714,282

BLAST-RESISTANT DOOR LATCHING SYSTEM

Dale K. Henderson, Vienna, Va., assignor to Temet, USA, Inc., Del.

Filed Jan. 29, 1986, Ser. No. 823,523
Int. Cl.[4] E05B *65/10*
U.S. Cl. 292—36 **6 Claims**



1. A blast door assembly comprising
(a) a door having an outer side and an inner side;
(b) moving latch means disposed on said door and switchable between a door latching position and a door unlatching position;
(c) a vertically shiftable travel bar means operably connected to the moving latch means, and having an upper position in which the moving latch means unlatches the door and a lower position in which the moving latch means latches the door, said travel bar means gravitationally biassing said moving latch means toward the latched position;
(d) an inertial stop means acting to block the upward unlatching movement of said travel bar means in the event of a blast, but not interfering with unlatching during normal use of the door;
(e) outer handle means operably connected to the travel bar means for opening the door from the outside; and
(f) inner panic bar means operably connected to the travel bar means for opening the door from the inside, said inner panic bar means being operable independently of said outer handle means.

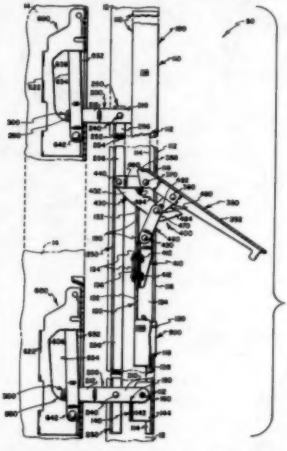
4,714,283

CLAMPING TYPE CABINET LOCK

Donald J. Dignan, South Euclid, Ohio, assignor to The Eastern Company, Strongsville, Ohio

Continuation of Ser. No. 602,173, Apr. 19, 1984, abandoned. This application Aug. 6, 1986, Ser. No. 894,378
Int. Cl.[4] E05C *9/02*
U.S. Cl. 292—48 **14 Claims**

1. A lock for releasably retaining a movable closure member such as cabinet door in a closed position with respect to an opening-defining structure such as a door frame, wherein the lock comprises:
(a) elongated operating unit means including first frame means for mounting on a selected one of a pair of relatively movable members such as a cabinet door and its associated door frame, with the first frame means having opposed forward and rearward sides thereof;
(b) at least one strike unit means including second frame means for mounting on the other of the relatively movable members;
(c) the strike unit means including strike channel means connected to the second frame means for defining an elongate strike channel, including elongate track means extending longitudinally along one side of the elongate strike channel for defining a pair of elongate, longitudinally extending, laterally spaced strike channel track surfaces, with the strike channel being bounded along at least portions of said one side by the pair of elongate, longitudinally extending, laterally spaced strike channel track surfaces;
(d) the operating unit means having components which are movable relative to the first frame means including:
(i) handle means pivotally connected to the first frame means for movement relative to the first frame means between a nested position defined within the first frame means, and an operating position projecting from the forward side of the first frame means;
(ii) arm means pivotally connected to the first frame means and disposed on the rearward side of the first



frame means for movement relative to the first frame means between released and clamped positions;
(iii) strike-engaging means carried on the arm means for engaging the strike channel track surfaces and for being guided by the strike channel track surface for movement longitudinally along the strike channel and for being releasably retained therein by the engagement between the strike-engaging means and the strike channel track surfaces;
(iv) operating means for drivingly interconnecting the handle means and the arm means for concurrent pivotal movement relative to the first frame means such that, when the handle means is moved to its operating position from its nested position, the arm means is caused to move from its clamped position to its released position whereby the strike-engaging means is moved within the strike channel to a position wherein it can be inserted into and removed from the strike channel, and when the handle means is moved to its nested position from its operating position at a time when the strike-engaging means is received within the strike channel, the arm means is caused to move from its released position to its clamped position whereby the strike-engaging means is caused to move along the strike channel to a position wherein the strike- engaging means is retained within

the strike channel by the engagement of the strike-engaging means with the track surfaces; and,

(v) latch means connected to the first frame means and having movable formation means for releasably engaging and selectively retaining the operating handle in its nested position.

4,714,284

LATCH ASSEMBLY

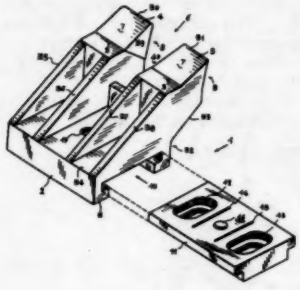
Marc F. Varlet, 8 rue des Ecoles, 56410 Etel, France

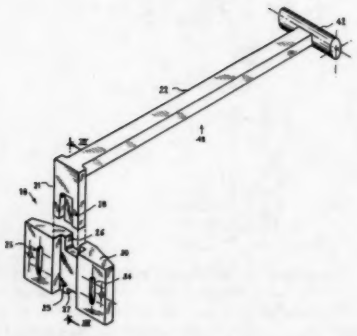
Filed Apr. 24, 1984, Ser. No. 603,297

Claims priority, application France, Apr. 29, 1983, 83 07546

Int. Cl.[4] E05C *19/06*

U.S. Cl. 292—91 **3 Claims**





1. A latch assembly comprising a first member and a second member, said first and second members being formed with respective means for catching said first member in said second member upon movement of said members towards each other, and a first attachment member and second attachment member, each being formed with means for attaching to one of a fixed and a movable frame member, with said first and second members and respective first and second attachment members being formed with cooperative attachment for selectively attaching the respective first and second members to one respective attachment member and the other first or second member to the other respective attachment member, said first member being formed with a flexible arm and a transversely disposed catch piece at the end thereof and said second member being formed with catch means to hold the catch piece upon said movement of said members toward each other, said catch means comprising two horns having bearing surfaces and forming a groove therebetween, wherein the catch piece rides the horns and catches there behind with the arm disposed in the groove.

4,714,285

FIRE-BREAK DOOR

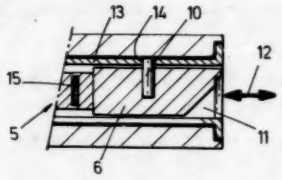
Richard J. Langham, St. Peter Port, Great Britain, assignor to D.R.I.M. Limited, Great Britain

Filed Jan. 17, 1985, Ser. No. 692,785

Claims priority, application Belgium, Mar. 27, 1984, 0/212637

Int. Cl.[4] E05B *17/20*

U.S. Cl. 292—163 **5 Claims**



1. A fire-break door comprising a door having at least one lock including a lock housing with a spring biased latch contained therein, said latch being moved from a latched position to a retracted position by an operating member, said spring bias urging said latch toward said latched position, said door cooperating with a door-closer for enabling it to automatically move said door back to the closed position, means comprising a fusible material secured in the entrance to the lock housing wherein the latch lies when in its recessed position, so as to lock said latch in such a recessed position by means of the fusible material to retain the latch in said retracted position against the bias action of the spring, said fusible material engaging said latch to prevent the latch from entering a keeper of the lock until said fusible material melts, said fusible material letting the latch be released to said latched position where it enters a keeper of the lock under the bias action of said spring in response to an abnormal rise in the temperature adjacent to the door, the operating member cooperating with the latch which is released by the fusible material for manually returning the latch into said retracted position against the spring bias action of the spring for opening the door whereby said door may be opened easily after the latch has been released in response to said high temperature.

4,714,286

AUXILIARY LOCKING MECHANISM FOR A CASE

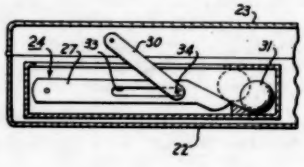
Ken Yamamoto, 22-5 4 chome, Nishisakado Sakado-shi, Saitama-ken, Japan

Continuation of Ser. No. 406,475, Aug. 9, 1982, abandoned. This application Jul. 29, 1985, Ser. No. 760,057

Claims priority, application Japan, Aug. 25, 1981, 56-125402; May 24, 1982, 57-75995

Int. Cl.[4] E05C *17/24*

U.S. Cl. 292—263 **10 Claims**



1. In a case having a body and a hinged lid attached to the said body the improvement comprising:

first lock means in said case for locking and securing said hinged lid in a closed position;

release means for releasing said first lock means for opening said lid;

auxiliary lock means connecting said body to said hinged lid said auxiliary locking means having means for holding said hinged lid in a partially open position when said case is positioned vertically with said first lock means released; said auxiliary lock means including means for automatically releasing said holding means to allow said hinged lid to fully open when said case is shifted from said vertical position to a horizontal position.

4,714,287

BENDING BAR TO BE USED AS A BUMPER OF A VEHICLE

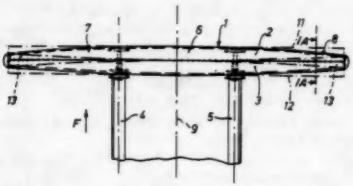
Josef Merkle, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Mar. 21, 1986, Ser. No. 842,256

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1985, 3510590

Int. Cl.[4] B60R *19/04*

U.S. Cl. 293—102 **27 Claims**



1. A bending bar for use as a bumper of a vehicle, a middle part located between two side parts, the side parts projecting on opposite sides of the middle part, the bending bar being mounted to two supports, the middle and side parts comprising:

a front half-shell comprising a middle web part and two leg parts, and

a rear half-shell comprising a middle web part and two leg parts,

one of said half-shells being connected, extensively along its length, to the other half shell by deformation of at least a portion of said one half-shell to generate a tensile prestress to prevent buckling of the legs and the webs of the half-shells.

4,714,288

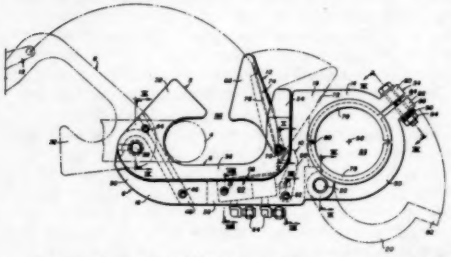
REMOTE RELEASE TOW HOOKS

Richard C. Tietze, Ft. Pierce, Fla., assignor to Harbor Branch Oceanographic Institution Inc., Ft. Pierce, Fla.

Filed Apr. 13, 1987, Ser. No. 40,044

Int. Cl.[4] B66C *1/36*

U.S. Cl. 294—82.33 **5 Claims**



1. A device with which a tow line may be attached to a towed object and then detached remotely which comprises:

a body member, a trip member, latch means and a keeper member,

said body member comprising a pivot portion and a tow portion integral with said pivot portion, both said portions lying in the same longitudinal plane,

said pivot portion including a first arcuate section integral with said tow portion, a second arcuate section hinged to said first arcuate section and fastener means to forceably close said second section upon said first section forming a circular opening in the said pivot portion transverse to said longitudinal plane, which opening serves as the means for connection of said device to said towed object,

said tow portion being J-shaped with an elongated leg section that extends along the longitudinal axis of said body member and an arcuate end section,

said trip member being C-shaped and integrally including an arcuate proximal section, a distal section and a central section,

said trip member being pivoted by said proximal section of said tow portion end section to swing between a latched position and a release position, and inclding spring means to bias said strip member into said latched position,

said latch means comprising a hook member pivoted at its fixed end on said elongated leg section to swing in said longitudinal plane, a ledge on said trip member positioned so the said hook member can engage said ledge to retain said trip member in said latched position and piston means to move said hook member into and out of engagement with said ledge, and

said keeper means comprising a keeper member of generally triangular cross-section pivoted at one end of said trip memver distal section to swing from a tow line admission position wherein it enters a mating notch in said first arcuate section of said pivot portion to a tow line retention position out of said notch toward said arcuate proximal section and spring means to bias said keeper member into said retention position.

4,714,289

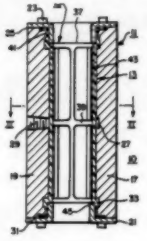
GRIPPER ASSEMBLY

Thomas E. Arzenti, Munhall, and William E. Pirl, Penn Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 785,292, Oct. 7, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 5,388

Int. Cl.[4] B66C *1/46*

U.S. Cl. 294—119.3 **10 Claims**



1. A gripper assembly for releasably engaging and firmly holding an object, said assembly including a retainer having an opening therein bounded by an inner wall of the retainer, a pliable flexible member extending over the surface of said inner wall, cooperative means near the ends of said flexible member and near the ends of said retainer for mounting said flexible member along substantially the whole length of the inner wall of said retainer to define an expandable pressure-tight volume between said flexible member and said inner wall, an annular

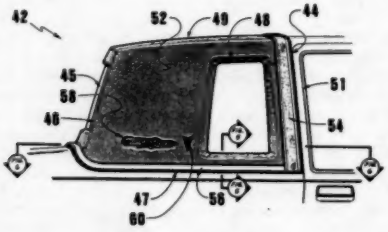
groove in the inner wall of said retainer intermediate its said ends in communication with said expandable volume, said groove being interposed between axial sections of said inner wall, and a port in said retainer, directly connected in fluid-transfer communication to said groove, coextensive with a peripheral section of said groove, for injecting through said groove a fluid into said expandable volume between said retainer and flexible member to extend said flexible member to engage said object under the pressure of said fluid, the axial length of said groove being substantially equal to the cross dimension of said port where said port is connected to said groove and said port directing said fluid into said groove whence it is transmitted into said expandable volume.

4,714,290

SIMULATED PADDED CAR ROOF COVER

David D. Eash, Woodbine, Md., assignor to E&G Classics, Inc., Columbia, Md.

Filed Mar. 10, 1986, Ser. No. 837,687
Int. Cl.[4] B62D *25/06*
U.S. Cl. 296—210 **12 Claims**



1. A cover for covering an exterior portion of an automobile roof, comprising:

means for simulating a padded vinyl automobile roof without the use of padding, said means including:

(a) a shell having an outer surface and an inner surface, said inner surface of said shell adapted to be secured to the exterior portion of the automobile roof;

(b) recess means formed in said outer surface of said shell; and

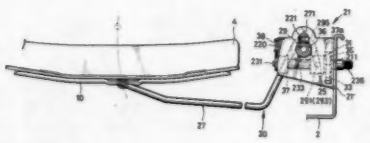
(c) a vinyl covering secured directly to said outer surface of said shell.

4,714,291

LUMBAR SUPPORT

Takemi Hattori, Kariya, and Nobuhiko Takeda, Oobu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 20, 1987, Ser. No. 28,403
Claims priority, application Japan, Mar. 31, 1986, 61-47822[U]
Int. Cl.[4] A47C *3/00*
U.S. Cl. 297—284 **3 Claims**



1. In a lumbar support comprising a seat back body, a resilient member supported by said seat back body, a lumbar plate one surface of which is abutted against said resilient member in such a manner that said resilient member is embraced by said lumbar plate and said seat back body, and plate moving means for moving said lumbar plate back and forth, an improvement wherein said plate moving means comprises:

a base portion supported by said seat back body and having a pair of opposing oblong holes;

a screw rod supported for free rotation on said base portion and having a male screw provided on its outer peripheral surface;

a nut member having a centrally formed female screw threadedly engaged with the male screw of said screw rod, said nut member being moved axially of said screw rod by turning the latter;

an anchor member connecting said lumbar plate to an outer circumferential surface of said nut member and having a ring-shaped pivot portion at an end portion thereof on the side of said nut member; and

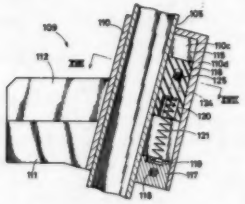
a distance compensating pin means having a pin passed through the ring-shaped pivot portion and supported at the oblong holes so as to be movable in the longitudinal direction of the oblong holes, wherein when said nut member is moved axially of said screw rod, the distance compensating pin moves in the longitudinal direction of the oblong holes so as to compensate for a change in distance between the center of the ring-shaped pivot portion and the center of rotation of said screw rod.

4,714,292

BABY CARRIAGE

Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

Continuation of Ser. No. 751,039, Jul. 1, 1985, abandoned. This application Dec. 17, 1986, Ser. No. 942,064
Claims priority, application Japan, Jul. 4, 1984, 59-101863[U]; Sep. 10, 1984, 59-13744[U]; Mar. 18, 1985, 60-54805[U]
Int. Cl.[4] A47C *7/50*
U.S. Cl. 297—437 **9 Claims**



1. A baby carriage, comprising footrest means, a pair of front legs having front wheels attached to lower ends of said front legs, said footrest means extending between said pair of front legs, a pair of slide means secured to said footrest means and slidably engaging each of said front legs for up and down movement of said footrest means along said front legs, whereby said pair of front legs function as guide rods for an upward and downward sliding movement of said footrest means, means for inhibiting said sliding movement of said footrest means, and means for fixing the level of said footrest means at a desired position, said footrest means comprising a foot support member for supporting the feet of an infant placed on the seat of the baby carriage, each of said slide means having a remote wall forming a clearance between it and an outer surface of said front leg and opposite to said outer front leg surface, said remote wall having an inner wall surface with a shape such that the clearance between it and the outer surface of said front leg in gradually narrowed toward the top, said inhibiting means comprising a stopper vertically movable in the clearance between the inner wall surface of said remote wall and the outer surface of said front leg, whereby said stopper in its upper limit position is pressed against the inner

wall surface of said remote wall and against the outer surface of said front leg opposed thereto, thereby inhibiting said slide means for sliding relative to said front leg, said footrest means further including a spring for constantly urging said stopper to move upward, and guide means (123, 124, 125) arranged for guiding said stopper along and in parallel with said outer front leg surface, whereby said stopper (116) is in frictional contact with said outer front leg surface at all times, and wherein said guide means comprise elongated holes (123, 124) in said slide means, and a pin (125) passing through said stopper (116) and through said elongated holes (123, 124), said elongated holes (123, 124) extending in parallel to said outer front leg surface for said guiding of said stopper along said front leg.

4,714,293

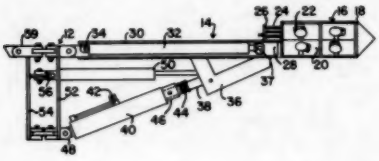
DUST CONTROL FLUIDS SPRAY ARM

John H. Watson, Shinnston, W. Va., assignor to Sun Hydraulics, Inc., Shinnston, W. Va.

Filed Mar. 17, 1986, Ser. No. 839,999

Int. Cl.[4] F21C *35/22*

U.S. Cl. 299—12 **23 Claims**



1. A dust control attachment for a long wall mining device having cutters, comprising:

a mounting member attached to said long wall mining device,

a connecting means pivotally mounted on said mounting member,

an elongated boom element pivotally mounted to said connecting means in a manner whereby said boom element is movable in two planes relative to said mounting member,

actuation means connected to said boom element and said connecting means for pivoting said boom element relative to said mounting member, said boom element being movable independently of movement of the cutters,

shock absorption means on said actuation means for minimizing the effect of shock impact force from falling objects on said boom element, said shock absorption means being capable of absorbing shock impact forces impacting at an angle relative to said boom element,

means on said boom element for dispersing pressurized fluid whereby said fluid is dispersed in proximity to the cutter, and

means for supplying fluid to said dispersing means.

4,714,294

DRUM AND CUTTER ASSEMBLY FOR A PLANING MACHINE

Leo Swan, Jefferson, Md., assignor to Equipment Development Company, Inc., Frederick, Md.

Filed Jun. 20, 1986, Ser. No. 876,489

Int. Cl.[4] E01C *23/09*

U.S. Cl. 299—39 **19 Claims**

11. A cutter assembly for mounting on a rotatable drum of a planing machine, comprising:

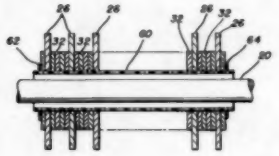
(a) a tubular member of predetermined length and thickness and being fabricated from material which pulverizes upon being subjected to torquing and compressional forces while in place on said planing machine during a planing operation.

(b) a plurality of circular cutting elements arranged in predetermined cutting pattern along said tubular member;

(c) a plurality of spacer members selectively arranged on either side of said cutting elements; and

(d) retaining means on each end of said tubular member for holding said cutting elements and spacer members in place thereon.

18. A method of preassembling a set of cutting elements on an elongated fracturable tube for subsequent mounting on a cutter shaft of a planing machine, comprising the steps of:



attaching a retaining clip to one end of said tube;

selectively placing said set of cutting elements and a set of spacers on said tube in direct contact therewith and in a predetermined order to form a desired linear cutting pattern;

attaching a retaining clip to the other end of said tube; and

thereafter mounting the entire unit on said cutter shaft.

4,714,295

SCRAPING ROLLER MOUNTING MEANS FOR SCRAPING MACHINES FOR SCRAPING OFF ROADS

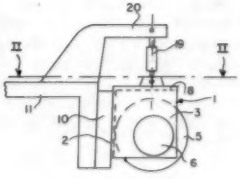
Reinhard Wirtgen, Hohner Strasse 2, D-5461 Windhagen, Fed. Rep. of Germany

Filed Feb. 14, 1986, Ser. No. 829,499

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1985, 3506551

Int. Cl.[4] E01C *23/12*

U.S. Cl. 299—39 **10 Claims**



1. Scraping roller mounting means for scraping machines for scraping off road surfaces with a frame arranged transversely to a direction of travel and and attached to a chassis by vertically adjustable mounting means, in which frame a scraping roller is mounted rotatably by its end faces and is drivable by a motor at least at one end face thereof,

wherein the frame (1) is guided on the chassis (11) by slide and thrust guide means (9,10) aligned vertically,

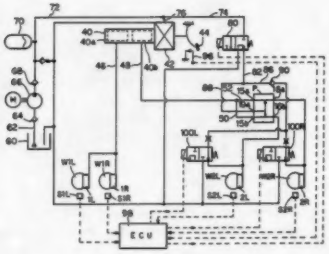
wherein said slide and thrust guide means (9,10) comprise two spaced guide rails (12) attached to the chassis (11), each having an approxmately T-shaped guide channel cross-section and two sliding elements (13) attached to the frame (1) and each having a cross-section adapted with play to the respective guide channel cross-section, and

wherein at least a part (15) of each sliding element (13) located in the guide channel (14) is of substantially circular construction.

4,714,296
HYDRAULIC CONTROL VALVE

Yuzo Imoto, Kariya; Hideo Wakata, Nagoya; Toshihiro Takei, Okazaki, and Yoshiyuki Hattori, Toyoake, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 19, 1985, Ser. No. 800,113
Claims priority, application Japan, Nov. 20, 1984, 59-245455
Int. Cl.[4] B60T *13/00, 8/44*
U.S. Cl. 303—6 C 13 Claims



1. A hydraulic control system for a vehicle having driving wheels comprising:

means for selectively producing a first hydraulic pressure;

wheel cylinder means for braking said driving wheels in response to said production of said first hydraulic pressure;

a hydraulic pump pumping a fluid up to a second hydraulic pressure;

selector valve means, serially connected to said hydraulic pump, for selecting either a by-pass position in a normal mode or, in response to a slip condition of said wheels, selecting a connecting position, and for passing said second hydraulic pressure through said selector valve means when said selector valve means is in said connecting position;

means, connected serially between said wheel cylinder means and said selector valve means, for selectively applying said second hydraulic pressure from said selector valve means to said wheel cylinder means in response to said slip condition of said wheels; and

a hydraulic control valve connected serially between said first hydraulic pressure producing means and said wheel cylinder means, and commonly connected, with said second hydraulic pressure applying means, to said wheel cylinder means, said hydraulic control valve including:

a valve body having first and second chambers formed separately therein;

an input port formed in said valve body so as to communicate with said first chamber, and to receive said first hydraulic pressure from said first hydraulic pressure producing means;

an output port formed in said valve body so as to communicate with said first chamber and to output said first hydraulic pressure to said wheel cylinder means;

a pressure reducing piston provided slidably within said first chamber so as to selectively interconnect said input and output ports;

means for biasing said pressure reducing piston to interconnect said input and output ports, said pressure reducing piston and said biasing means including means for reducing said first hyraulic pressure applied to said input port at a fixed ratio to a lower hydraulic pressure provided at said output port when said first hydraulic pressure applied to said input port is higher than a predetermined level;

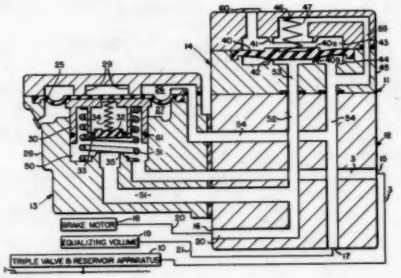
a third port formed in said valve body so as to communicate with said second chamber, and to receive said second hydraulic pressure from said selector valve means when said selector valve means selects said connecting position; and

control piston means for disconnecting said input and output ports when said second hydraulic pressure is applied to said third port.

4,714,297
FLUID PRESSURE BRAKE CONTROL PORTION

Lawrence E. Vaughn, Watertown, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Filed Mar. 27, 1986, Ser. No. 844,660
Int. Cl.[4] B60T *15/32*
U.S. Cl. 303—33 2 Claims



1. A fluid brake control system for a multiple truck vehicle comprising triple valve and reservoir means on the vehicle for governing supply of fluid from a reservoir to brake motor means on the respective trucks comprising;

(a) a fluid pressure control portion connected between the triple valve and reservoir means and a predetermined brake motor of the brake motor means for limiting fluid pressure in that motor,

(b) the fluid pressure control portion comprising;

(1) proportioning valve means for proportioning fluid pressure delivered to the predetermined fluid brake motor relative to fluid pressure delivered to the fluid pressure control portion by the triple valve means, and

(2) inshot poppet valve means for selectively governing the proportioning valve means during brake application,

(c) the fluid pressure control portion comprising a pipe bracket through which the proportioning valve means and the inshot poppet valve means have interconnecting fluid passages,

(d) the proportioning valve means having a diaphragm seperating upper and lower fluid chambers in proportioning valve housing means;

(1) a piston spring biased against the diaphragm in the lower chamber,

(2) a poppet valve contained within the piston disposed to be spring biased downwardly to at times actuate its face against a seat in the proportioning valve housing means to close a fluid passage from the triple valve to the brake motor through the pipe bracket, and

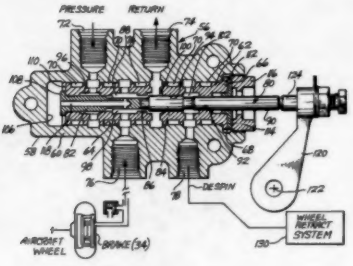
(3) the upper chamber being connected by a fluid passage through the pipe bracket to an equalizing volume, and

(e) the inshot poppet valve means being operable to permit the proportioning valve means to be effective to reduce fluid pressure delivered to the fluid motor as compared to fluid pressure delivered to the proportioning valve means by the triple valve and reservoir means only after a predetermined minimum pressure has been applied to the fluid motor.

4,714,298
AIRCRAFT WHEEL BRAKE METERING AND DESPIN VALVE

Jacob A. Mail, Hertzia, Israel, assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 13, 1984, Ser. No. 681,300
Int. Cl.[4] B64C 25/10
U.S. Cl. 303—100 **14 Claims**



1. A metering and despin valve for use in an aircraft to control pressure and flow to and from a wheel brake on a retractable landing gear, said valve comprising:

a housing including wall means defining an elongated first chamber having an open end and a closed end, said housing further including a supply pressure port, a return pressure port, a brake port and a despin port;

an elongated sleeve within said first chamber, said sleeve including an inner end, an outer end, and an elongated second chamber having an open inner end and an open outer end, said sleeve being inserted into the housing through the open end of the first chamber;

retainer means at the open end of the first chamber for securing the sleeve within the housing;

an elongated port control member within said second chamber, including a control end portion which projects from the second chamber, through and then outwardly beyond said retainer means;

said port control member comprising a pair of axially spaced apart lands and an annular galley between the lands;

said sleeve including first passageway means communicating the second chamber with the supply pressure port, second passageway means communicating the second chamber with the brake port, third passageway means communicating the second chamber with the return port and fourth passageway means communicating the second chamber with the despin port;

said port control member having a retracted position in which said annular galley communicates the first passageway means, and hence the supply pressure port, with the second passageway means, and hence the brake port, and the second land means closes the third passageway means;

said port control member having an extended position in which the first land closes the first passageway means and the annular galley connects the second passageway means, and hence the brake port, with the third passageway means, and hence the return port;

said port control member functioning to meter brake pressure from the supply pressure port to the brake port in response to the port control member being moved from its extended position to its retracted position;

said port control member comprising an annular command pressure chamber located between the second land and the control end portion;

said control end portion being smaller in diameter than and first and second lands;

said command pressure chamber being always in communication with the fourth passageway means;

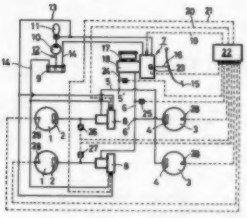
said command pressure chamber having a radial surface at the end thereof adjacent said second land, functioning as a pressure surface directed to produce a force acting on the port control member, in response to hydraulic pressure in the command pressure chamber, for urging the port control member toward a brake applying retracted position; and

said port control member being inserted into the second chamber from the inner end of said second chamber, prior to the sleeve being inserted into the first chamber.

4,714,299
BRAKE PRESSURE CONTROL SYSTEM

Koji Takata, and Yukinori Nishiyama, both of Itami, Japan, assignors to Sumitomo Electric Industries, Limited, Japan

Filed May 1, 1984, Ser. No. 605,790
Claims priority, application Japan, May 10, 1983, 58-82968; May 30, 1983, 58-97499
Int. Cl.[4] B60T 8/58, 8/64, 11/00, 8/44
U.S. Cl. 303—100 **12 Claims**



1. A brake pressure control system for a vehicle having a hydraulically operated front brake and a hydraulically operated rear wheel brake, a brake pedal actuable by an operator, and hydraulic means for operating said front and rear brake means upon operation of said brake pedal, comprising;

said hydraulic means including brake pressure control means for electronically controlling the brake pressure of said front wheel brake and said rear wheel brake independently of each other;

pedal force detecting means for measuring the amount of force applied to said brake pedal;

wheel speed detecting means for detecting the rotational speed of each of the wheels;

brake pressure detecting means for detecting the brake line pressure controlled by said brake pressure control means;

and data processing means for giving signals to said brake pressure control means and being programmed

(1) for controlling the deceleration of the vehicle calculated with information obtained by said wheel speed detecting means according to a desired deceleration calculated with the information obtained by said pedal force detecting means;

(2) to relieve and restore the brake pressure to avoid a wheel lock condition when a potential wheel lock is sensed on the basis of the information obtained by said wheel speed detecting means; and

(3) to control the distribution of brake pressure between said front wheel brake and said rear wheel according to an ideal distribution computed with presupposed effectiveness coefficient of said brakes, the brake pressure detected by said brake pressure detecting means and the deceleration computed from said wheel speed detecting means when a potential wheel lock condition is not sensed.

8. A brake pressure controller for use with a brake system having a first brake pressure line for supplying pressure to a first wheel brake and a second brake pressure line for supplying pressure to a second wheel brake, said controller comprising a first control means selectively operable by an operator and having a first pressure-receiving portion communicating with said first brake pressure line for supplying fluid pressure

thereto and a second pressure-receiving portion communicating with said second brake pressure line for supplying fluid pressure thereto, means for controlling the sum of a thrust acting on said first pressure-receiving portion and a thrust acting on said second pressure-receiving portion in relation to the operator input and to a sensed condition for varying the thrust acting for a given operator input to prevent an undesired braking condition, and a second control means having a third pressure-receiving portion communicating with said first brake pressure line and a fourth pressure-receiving portion communicating with said second brake pressure line and means for varying the relative pressure supplied by said second control means to said first and second brake pressure lines for controlling the difference between a thrust acting on said third pressure-receiving portion and a thrust acting on said fourth pressure-receiving portion.

4,714,300

PRESSURE MODULATOR FOR ANTI-SKID BRAKE SYSTEMS

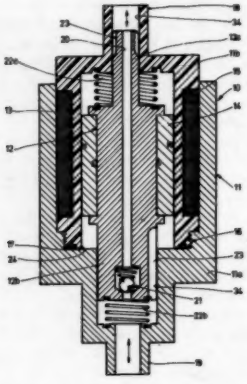
Gerhard Heess, Tamm, Fed. Rep. of Germany; Dean Karnopp, Davis, Calif., and Anton van Zanten, Ditzingen, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 23, 1986, Ser. No. 888,659

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526189

Int. Cl.[4] B60T *8/42*

U.S. Cl. 303—115 **23 Claims**



1. A pressure modulator for a motor vehicle brake system actuated via a pressurized brake fluid and including a master cylinder and at least one wheel brake, comprising a pressure-tight housing including means defining a pump cylinder disposed between said master cylinder and said at least one wheel brake, said pump cylinder provided with a pump plunger longitudinally displaceable therein forming an armature, said armature encompassed by a surrounding electromagnetic coil disposed securely in said housing, at least part of said armature being comprised of a polarized permanent magnet operable for displacement by an exciter current supplied to said electromagnetic coil further to displace the pump plunger in a first direction to force brake fluid to flow to at least one driven wheel associated with a wheel brake, which driven wheel is tending to spin due to excessive drive mount applied thereto, whereby the rising brake fluid pressure in said wheel brake causes wheel spin thereof to be reduced.

4,714,301

HYDRAULIC ANTI-SKID BRAKING SYSTEMS FOR VEHICLES

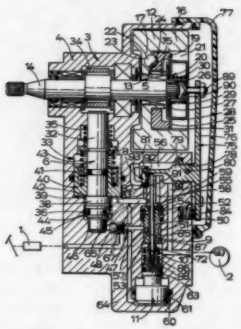
Glyn P. R. Farr, Warwickshire, England, assignor to Lucas Industries Public Limited Company, United Kingdom

Filed Mar. 6, 1986, Ser. No. 837,004

Claims priority, application United Kingdom, Mar. 15, 1985, 8506707

Int. Cl.[4] B60T *8/42, 13/70*

U.S. Cl. 303—116 **6 Claims**



1. An hydraulic anti-skid braking system for a vehicle comprising a brake on a wheel of the vehicle, a supply of operating fluid for applying said brake, skid sensing means for emitting skid signals in accordance with the behaviour of said wheel when said brake is applied, a modulator assembly for modulating said supply of operating fluid to said brake in accordance with said skid signals and incorporating an expansion chamber, valve means between said supply and said brake and movable between an open position and a closed position, and an hydraulic pump to control re-application of said brake following emission of said skid signal, and a dump valve to initiate operation of said pump following movement of said valve means into said closed position, said dump valve being movable between a closed position and an open position, transmission means acting between said skid sensing means, and said dump valve and said valve means, to hold said dump valve in said closed position and said valve means in said open position when no skid signal is present, and means defining a lost-motion connection in said transmission means, said lost-motion connection being so constructed and arranged as to permit said valve means to move into said closed position and subsequently for said dump valve to move into said open position, whereafter operation of said pump is initiated, wherein said modulator assembly comprises a stepped bore, and a time-delay piston of differential area working in said stepped bore and having a first end of smaller area exposed to pressure of said valve means and a second end of greater area exposed to pressure in said expansion chamber which is equal to that applied to said brake, equalisation of said pressures acting on said first and second ends of said time-delay piston causing said piston to move in a direction progressively to open said valve means whereby to ensure that fluid from said supply flows into said brake at a rate faster than the rate at which said fluid is returned from said brake to said supply by said pump.

5. An hydraulic anti-skid braking system for a vehicle comprising a brake on a wheel of the vehicle, a supply of operating fluid for applying said brake, skid sensing means for emitting skid signals in accordance with the behaviour of said wheel when said brake is applied, a modulator assembly for modulating said supply of operating fluid to said brake in accordance with said skid signals and incorporating an expansion chamber, valve means between said supply and said brake, and an hydraulic pump to control re-application of said brake following emission of said skid signal, and a dump valve operable by said skid sensing means following closure of said valve means,

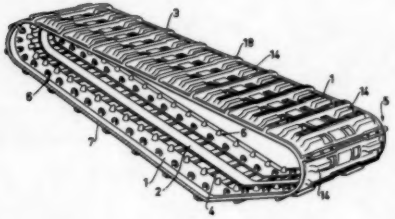
whereafter operation of said pump is initiated, wherein said modulator assembly comprises a stepped bore, and a time-delay piston of differential area working in said stepped bore and having a first end of smaller area exposed to pressure of said valve means and a second end of greater area exposed to pressure in said expansion chamber which is equal to that applied to said brake, equalisation of said pressures acting on said first and second ends of said time-delay piston causing said piston to move in a direction progressively to open said valve means whereby to ensure that fluid from said supply flows into said brake at a rate faster than the rate at which said fluid is returned from said brake to said supply by said pump, including a flow-regulator valve incorporating a variable orifice and a fixed orifice, and the pressure at said supply to which said first end of the piston of smaller area is exposed is applied to said brake through said variable orifice in said flow-regulator valve, and said pressure in the expansion chamber is applied to said second end of said piston which is of greater area through said fixed orifice, and wherein said flow-regulator valve comprises a bore, a spool working in said bore, and said spool is provided with a through-bore, and a valve head is engageable with a seating in said spool at one end of said through-bore to isolate said supply from said brake in response to operation of said skid sensing means followed by closure of said dump valve and a progressive reduction in the size of said variable orifice, movement of said time-delay piston towards the flow-regulator valve causing movement of said spool relatively away from said head and in a direction to increase progressively the effective size of said variable orifice.

4,714,302

VEHICLE TRACK

Assar Svensson, Ersmark, and Dan Granlund, Skellefteå, both of Sweden, assignors to Skega Aktiebolag, Ersmark, Sweden

Continuation of Ser. No. 000,446, Jan. 2, 1979, abandoned. This application Aug. 11, 1981, Ser. No. 291,967
Claims priority, application Sweden, Feb. 1, 1978, 7800024
Int. Cl.[4] B62D *55/24*
U.S. Cl. 305—35 EB **6 Claims**



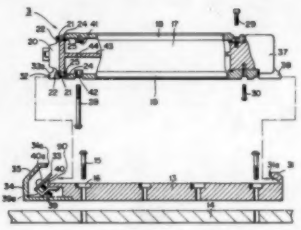
1. A vehicle track intended to be driven over spaced toothed drive wheels, preferably of rubber, and be supported on supporting wheels, comprising longitudinal inner and outer traction members formed of the same piece of an elastomer material and extending in parallel with each other, which traction members between themselves have tooth spaces for cooperation with the drive wheels, and transverse carrying members located on the outside of the track and connecting said longitudinal traction members, which longitudinal traction members and carrying members have cast-in reinforcements, and the reinforcement of each carrying member includes a beam of metal cast in the carrying member and having substantially U-shaped cross-section, the legs of which face outward and have a shorter height than the carrying member, and guide tongues located on the inside of the track are provided for cooperation with the supporting wheels of the vehicle, characterized in that the guide tongues are located on the outer traction members adjacent the tooth spaces and are connected directly to the beams, and that the portions of the carrying members which extend over the outer traction members have a greater height than in the whole of the area between the outer traction members.

4,714,303

HOUSING AND SECURING STRUCTURE FOR RADIO COMMUNICATION DEVICE

Narumi Suzuki, Ohtawara, and Hisamitsu Takagi, Inagi, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 27, 1985, Ser. No. 749,278
Claims priority, application Japan, Aug. 30, 1984, 59-179331
Int. Cl.[4] A42B *81/00*
U.S. Cl. 312—7.1 **11 Claims**



1. A housing and securing structure for a radio communication device including communication circuits, comprising:

a case for housing a radio communication device, said case including an upper lid, a bottom lid and a main housing body having one of the communication circuits mounted thereon;

mount means, having a mount surface, for mounting said case such that said bottom lid faces said mount surface of said mount which is secured to a vehicle;

means for securing said case of said mount means, said securing means including a projection member which projects in the direction parallel to said mount surface and a pressing plate with an aperture, which plate defines a recess for receiving said projection member between said pressing plate and said mount means, said projection member being disposed on and integrally assembled with one of said case and said mount means and said pressing plate being disposed on the other one of said case and said mount means;

a bracket immovable with respect to said mount means;

a first screw being screwed into said bracket through said aperture of said pressing plate and having a head which engages and urges said engagement member, located between said pressing plate and said mount means with which said bracket is immovably assembled, onto said projection member;

a second screw inserted from said bottom lid side into said case, penetrating through said main housing body and screwed into said upper lid from the inside thereof to simultaneously combine said upper lid, bottom lid and main housing body into one unit;

a panel having a connector for connecting to said communications circuit, said panel being disposed on an outer surface of said case and integrally assembled with said case which is mounted on said mount means;

means for attaching said panel to said case, said means comprising a projection piece and a receiver for receiving said projection piece, one of said projection piece and said receiver being disposed on the upper and lower edges of said panel, and the remaining one of said projection piece and said receiver being disposed on said upper lid and said bottom lid, said panel being integrally assembled with said upper lid, said bottom lid and said main housing by said second screw; and

a cover disposed over said pressing plate and having a hole formed therein for insertion of an instrument for manipulation of said first screw, said hole being smaller than the head of said first screw, said cover being disposed at a

distance from said bracket which is shorter than the length of said first screw, so that the cover prevents the first screw from being completely unscrewed and dropping out of said bracket.

4,714,304

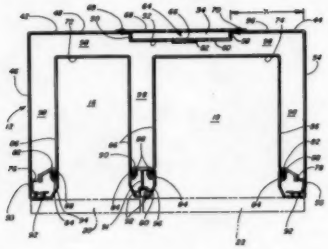
BUILT-IN REFRIGERATOR CABINET

George W. Sisk, Center Township, Vanderburgh County; Shelby A. Lynn, Johnson Township, Gibson County; John P. Keil, Ohio Township, Warrick County, and John T. Woods, Scott Township, Vanderburgh County, all of Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 29, 1986, Ser. No. 946,900

Int. Cl.[4] F25D *11/02*

U.S. Cl. 312—214 **18 Claims**



12. A cabinet for a refrigerator/freezer having a machine compartment at the top thereof, comprising:

first and second outer shell sections, each of said shell sections having an outer sidewall and a backwall, said backwall including an inner forwardly turned flange and an inwardly extending distal portion;

first securing means for securing said distal portion of said first shell section in selected overlapping relation to said distal portion of said second shell section to define a rearwardly opening recess;

a cover section overlying said rearwardly opening recess defining a duct;

second securing means for securing said cover section to said backwall sections;

a first liner having a selected width within and spaced inwardly from said outer shell sections;

a second liner having a selected width within and spaced inwardly from said outer shell sections and said first liner;

first breaker means for securing said first and second liners to said first and second outer shell sections;

second breaker means for securing said first liner to said second liner; and

a body of insulation disposed between said outer shell sections and said liners, wherein said duct and said insulation together act as a beam to provide added strength to the cabinet.

4,714,305

SPICE RACK

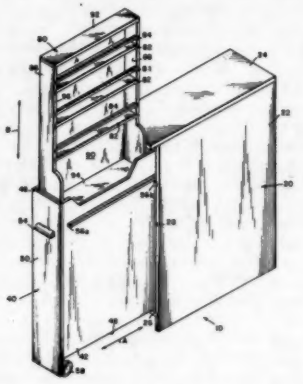
Robert S. Service, 1914 Selby Ave., Los Angeles, Calif. 90025

Filed Aug. 15, 1986, Ser. No. 897,018

Int. Cl.[4] A47B *88/04*

U.S. Cl. 312—306 **9 Claims**

1. A spice rack assembly comprising three sections, a hollow outer cabinet open on one side and having a top wall, a hollow inner receptacle member open at the top and having substantially continuous front, back, and side walls, means to slide said inner receptacle member laterally through said side opening of said outer cabinet, a spice rack member having a back, opposite sides, and a plurality of shelf members interconnecting the opposite sides means to slide said spice rack member vertically to a predetermined position above said top wall of said hollow outer cabinet to expose at least one of said shelf members, through said top opening of said inner receptacle member subsequent to said inner receptacle being laterally slid through said cabinet open side, said means to slide said spice rack mem-



ber vertically including sliding guide sets in cooperative association on the back of said spice rack member and the back of said inner receptacle member.

4,714,306

INSULATION DISPLACEMENT CONNECTION (IDC) TYPE CABLE CONNECTOR AND A METHOD FOR ASSEMBLING A CABLE THERETO

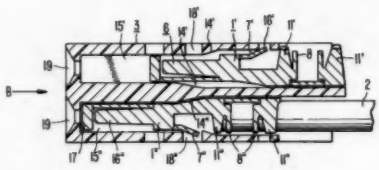
Hideo Miyazawa; Ikuhiro Andoh, both of Yokohama; Hiromichi Koyama, Suzaka, and Mitsuru Kobayashi, Nagano, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 6, 1987, Ser. No. 11,601

Claims priority, application Japan, Feb. 7, 1986, 61-025005

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—395 **13 Claims**



1. A cable connector having a plurality of contacts to be engaged with respective counterpart of opposite connector, said cable connector comprising:

plurality of contact terminals made from metal each of which being provided with,

a contact part provided at one end of said contact terminal for contacting to corresponding terminals of opposite connector, and

a connection part provided at another end of said contact terminal for connecting cable thereto;

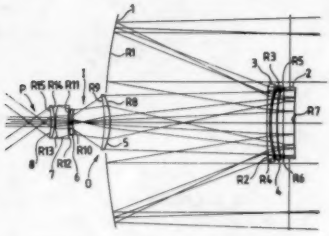
a housing made from insulator for holding said contact terminals, said housing being provided with holes corresponding to each contact terminals for holding them separated from each other; and

a pre-loading means for holding said contact terminals at a first and second position in said hole in the housing, in said first position said connection part of said contact terminal is exposed from the hole of said housing, while in said second position said connection part of said contact terminal is entirely covered by wall of said hole in the housing.

4,714,307
CATADIOPTRIC INFRARED LENSES

John M. Palmer, Clwyd, Wales, assignor to Pilkington P.E. Limited, United Kingdom

Filed Jul. 10, 1986, Ser. No. 883,919
Claims priority, application United Kingdom, Jul. 13, 1985, 8517727
Int. Cl.[4] G02B 17/08, 13/14
U.S. Cl. 350—1.3 16 Claims

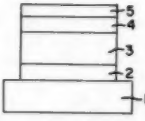


1. A catadioptric lens comprising a primary mirror having an opening, a Mangin secondary mirror of a first optically transmissive material, and a pair of refracting lens elements respectively of second and third optically transmissive materials different from each other and from said first optically transmissive material, said pair of elements being disposed in the light paths between the primary mirror and the Mangin secondary mirror and between the Mangin secondary mirror and the opening in the primary mirror.

4,714,308
ULTRAVIOLET REFLECTING MIRROR

Mitsuharu Sawamura, Yokohama, and Yasushi Taniguchi, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1985, Ser. No. 705,521
Claims priority, application Japan, Feb. 29, 1984, 59-35959
Int. Cl.[4] G02B 5/28
U.S. Cl. 350—1.7 6 Claims

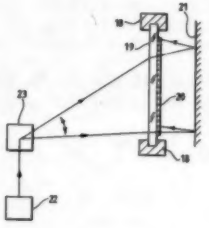


1. An ultraviolet reflecting mirror comprising in sequence (a) a substrate; (b) a high reflection factor film provided on said substrate; and (c) one or more sets of dielectric material layers comprising a first layer of low refractive index film and a second layer of high refractive index film on said first layer; said high reflection factor film having a film thickness of at least 250 angstroms and being capable of reflecting a light beam by its surface; said higher refractive index film and said low refractive index film, each having an optical film thickness of approximately $(2n-1)\lambda/4$, wherein n is a natural number, λ is the design wavelength, and $150\ nm \leqq \lambda \leqq 300\ nm$; and in at least one of said sets of dielectric material layers at least one of said high refractive index film and said low refractive index film have an optical film thickness of at least $3\lambda/4$.

4,714,309
REFLECTION HOLOGRAMS

Brian H. Woodcock, and Stuart S. Duncan, both of Clwyd, Wales, assignors to Pilkington P.E. Limited, United Kingdom

Filed Jun. 5, 1985, Ser. No. 741,540
Claims priority, application United Kingdom, Jun. 9, 1984, 8414761
Int. Cl.[4] G02B 5/32; G03H 1/04
U.S. Cl. 350—3.7 17 Claims

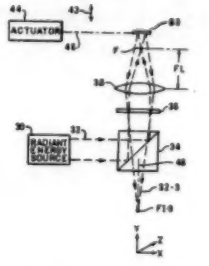


1. A method of making a reflection hologram including the steps of directing an illuminating beam towards a photosensitive film from a substantially fixed apparent beam source position, moving the illuminating beam angularly relatively to the film in a manner such that said substantially fixed apparent beam source position remains substantially stationary relative to the film, and reflecting the illuminating beam back to the film after passage therethrough from a reflector spaced from the film so as to cause interference in the film between the illuminating beam and the beam reflected from the reflector.

4,714,310
METHOD AND APPARATUS FOR DYNAMIC FOCUSING CONTROL OF A RADIANT ENERGY BEAM

Norman A. Peppers, Belmont, and Louis F. Schaefer, Palo Alto, both of Calif., assignors to SRI International, Menlo Park, Calif.

Filed Apr. 21, 1986, Ser. No. 854,222
Int. Cl.[4] G02B 26/08, 17/00
U.S. Cl. 350—6.6 2 Claims



2. A system for dynamic control of the divergence or convergence of a radiant energy beam comprising,

a radiant energy source,

spherical focusing lens means in the path of radiation from the radiant energy source to provide a converging radiant energy beam,

a movable cylindrical reflector for reflecting the radiant energy beam from the spherical focusing lens means back through the focusing lens means, and

means for moving the cylindrical reflector along the beam axis for controlling convergence or divergence of the reflected energy beam from the spherical focusing lens

means, convergence or divergence of the reflected radiant energy beam from the spherical focusing lens means being unequally affected in both of two perpendicular planes containing the beam axis, one of which planes extends across the cylindrical reflector and the other of which extends longitudinally thereof.

4,714,311

CONTROLLABLE INTEGRATED OPTICAL COMPONENT

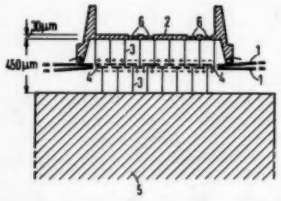
Franz Auracher, Baierbrunn, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 16, 1984, Ser. No. 631,401

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1983, 3337513

Int. Cl.⁴ G02B *6/12*

U.S. Cl. 350—96.11 **20 Claims**



1. A controllable integrated optical component, comprising:
a conductive first strip of a microwave line including a substrate having electro-optical property;
a conductive second strip of the microwave line disposed spaced from and generally parallel to said substrate;
at least one optical waveguide in said substrate between said first and second strips; and
a plurality of electrodes which may be charged with alternate electrical potentials disposed between said first and second strips, each of said electrodes connected to a respective strip.

4,714,312

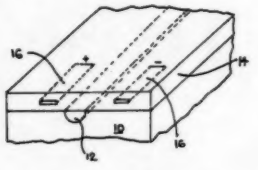
ELECTROSTATICALLY BIASED ELECTROOPTICAL DEVICES

Suwat Thaniyavarn, Pasadena, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed May 19, 1986, Ser. No. 864,231

Int. Cl.⁴ G02B *6/12*

U.S. Cl. 350—96.14 **6 Claims**



1. An electrooptical device, comprising:
an electrooptical substrate;
an optical waveguide formed in the substrate;
an insulating layer formed over the substrate; and
a pair of metal electrodes embedded within the insulating layer, the electrodes being completely enclosed within the insulating layer and bearing opposite electrostatic charges, to generate a desired electric biasing field to influence the waveguide, without requiring an external voltage source.

4,714,313

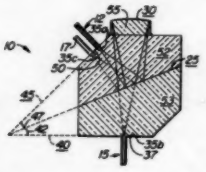
STAR COUPLER FOR OPTICAL FIBERS

Narinder S. Kapany, Woodside, and Fred C. Unterleitner, Palo Alto, both of Calif., assignors to Kaptron, Inc., Palo Alto, Calif.

Filed May 2, 1984, Ser. No. 606,119

Int. Cl.⁴ G02B *6/28*

U.S. Cl. 350—96.16 **19 Claims**



1. A star coupler with monitoring means comprising:
a first bundle of N input fibers having respective ends registered at a first plurality of input fiber locations in a first region;
a second bundle of N monitor fibers corresponding to said N input fibers and having respective ends registered at a second plurality of monitor fiber locations in a second region, said second plurality of monitor fiber locations and said first plurality of input fiber locations having corresponding geometries;
an integrating element having an entrance portion and an exit portion, said entrance portion being registered in a third region, said integrating element having the property that light entering said entrance portion at any point thereof exits said exit portion over substantially the entire extent thereof;
a beam splitter; and
at least one imaging element;
said beam splitter and said at least one imaging element being disposed relative to said first, second, and third regions so that when light emanates from any given one of said input fiber ends, a minor portion of said light emanating from said given one of said input fiber ends is imaged at the corresponding monitor fiber location so as to enter the corresponding monitor fiber, and a major portion of said light emanating from said given one of said input fiber ends is imaged at a sub-region in said third region so as to enter said entrance portion of said integrating element.

4,714,314

MODE DEPENDENT, OPTICAL TIME DELAY SYSTEM FOR ELECTRICAL SIGNALS

Andrew C. Yang, Concord; Richard Payne, Sudbury, and Richard A. Soref, Newton, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

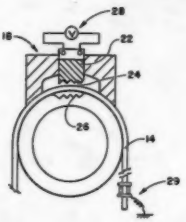
Filed Feb. 6, 1985, Ser. No. 698,721

Int. Cl.⁴ G02B *6/36, 7/26*

U.S. Cl. 350—96.20 **11 Claims**

1. A mode dependent, optical time delay system for electrical signals comprising:
a highly multi-mode optical fiber having a step index profile and a longitudinal axis;
means for receiving an incoming electrical signal, converting said electrical signal into an optical signal, and feeding said optical signal into one end of said multi-mode optical fiber at a predetermined angle with respect to said longitudinal axis of said fiber;
means located a predetermined distance, L, from the other end of said multi-mode optical fiber for preselectively controlling the mode of said optical signal passing through said multi-mode fiber; and
means positioned in optical alignment with the other end of

said multi-mode optical fiber for receiving said optical signal after propagating therethrough and for converting said optical signal into an electrical output signal, said electrical output signal being time delayed by a predetermined amount, Δt, in direct relation to the mode of said



optical signal propagating through said multi-mode optical fiber, said mode being altered by said mode controlling means and said amount of time delay, Δt, being equal to $nL\theta^2/2c$, wherein n equals the core index of said fiber; θ equals the ray angle of said mode propagating through said fiber; and c equals the speed of light.

4,714,315

METHOD FOR CONNECTING ELEMENTS OF OPTICAL COMMUNICATION TECHNOLOGY TO ONE ANOTHER OR TO ELEMENTS OF RELEASABLE PLUG CONNECTIONS

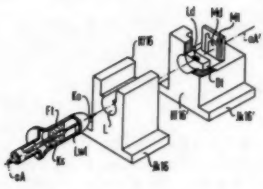
Dieter Krause, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 15, 1985, Ser. No. 787,112

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 3438340

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **17 Claims**



16. An optical transmitter module comprising a laser diode, a coupling optics and a light waveguide, wherein the optical axis of the coupling optics is aligned in a prescribable adjusted position relative to the optical axis of the laser diode, said module including a first adjustment member receiving the light waveguide and the coupling optics, a second optical adjustment member receiving the laser diode, said first adjustment member and said second adjustment member each having coupling faces aligned orthogonally relative to the optical axis of the coupling optics and of the laser diode, respectively, said first and second adjustment members being positioned with the coupling faces lying against one another without play and being connected to one another by at least one spot weld in a region of a part of seam formed by edges of the coupling faces spaced inwardly from a circle circumscribing the profile of the coupling faces.

4,714,316

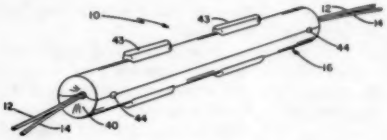
OPTICAL FIBER UNIT HAVING PROTECTIVE ASSEMBLY

Wayne E. Moore, Holliston; Stephen R. Quinn, Medfield; Wesley M. Tufts, Holliston, and William F. Gasko, Berlin, all of Mass., assignors to Aster Associates, Milford, Mass.

Filed Aug. 20, 1985, Ser. No. 767,492

Int. Cl.[4] G02B *6/26*

U.S. Cl. 350—96.20 **16 Claims**



1. An optical fiber unit comprising:

an optical fiber means configured to provide an optical function,

a performed rigid, hollow internal protective body having a preformed space of limited length into which said optical fiber means extends with a relatively close fit,

said internal protective body being of a material of hardness and coefficient of thermal expansion substantially matched to that of said fiber means and said fiber means being bonded thereto,

an outer protective body surrounding said internal protective body, at least a portion of said outer protective body being injection-molded, said body having a performed recess shaped to receive and support said rigid internal protective body, said internal body seated in said recess,

a mass of relatively soft uniting material disposed in a manner to secure said internal protective body to said performed portion of said outer protective body,

said injection-molded portion of said outer protective body, being of substance less rigid and brittle than said internal protective body, effectively surrounding and protecting said internal protective body and the fibers therewithin from the environment in which the unit is intended for use, and

stress relief means associated with said outer protective body through the outer protective body in a manner that is effective to prevent breakage of said fiber means under conditions of stress on said fiber means.

4,714,317

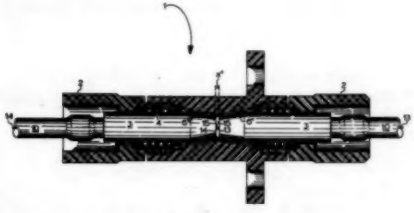
BICONIC OPTICAL FIBER CONNECTOR/ATTENUATOR

Otto I. Szentesi, Hickory, N.C., assignor to Siecor Corporation, Hickory, N.C.

Filed Apr. 14, 1986, Ser. No. 851,463

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.21 **3 Claims**



1. A biconic optical fiber connector adapted to introduce into an optical fiber transmission line a predetermined amount of attenuation comprising:

(a) a male member, a portion of which is frustroconical shaped and has a terminal free surface;

(b) a socket member having a frustroconical shape, adapted to receive the frustroconical shaped portion of the male member;

(c) a first optical fiber disposed in the male member, having a terminal free end in communication with the terminal free surface of the male member;

(d) a second optical fiber having a terminal free end, the terminal free end of the first optical fiber being in alignment with and exposed to the terminal free end of the second optical fiber; and,

(e) a shim with an aperture in it, having outside and inside surfaces delimiting a frustroconical shape and a predetermined wall thickness between them, received in the socket and disposed over the frustroconical portion of the male member, the wall thickness of the shim causing the free ends of the first and second optical fibers to be separated one from another a predetermined distance so as to introduced into an optical fiber transmission line which includes the first and second optical fibers a predetermined amount of attenuation that is a function of the shim's wall thickness.

4,714,318

CONNECTOR FOR OPTICAL FIBERS WITH A GAP

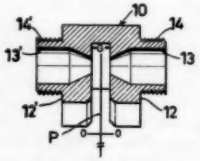
Kyozo Hayashi, and Shigeru Noda, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Japan

Filed May 14, 1982, Ser. No. 378,127

Claims priority, application Japan, May 22, 1981, 56-74775[U]

Int. Cl.⁴ G02B *6/36*

U.S. Cl. 350—96.21 **6 Claims**



2. An optical connector for connecting a pair of optical fibers together with a gap between their opposed ends, comprising: a body for supporting a pair of optical fibers therein, a pair of sleeves, means on said body for mounting each of said sleeves in a centered relation to the other of said sleeves, a pair of lenses each fixed in a respective of said sleeves, and a pair of plugs and means for mounting each of said plugs in centralized location relative to a respective of said sleeves, each of said plugs being formed with a hole for holding the end of an optical fiber in forced engagement with the lens of the respective sleeve, a pair of nuts adapted to be screwed on the ends of said body and to engage an annular flange formed on said plug.

4,714,319

APPARATUS FOR RELIEF ILLUSION

Yehoshua Y. Zeevi, Department of Electrical Engineering, Technion Israel Inst. of Tech., Haifa, Israel, and Antonio Medina, Filipinas 46, Madrid 3, Spain

Filed Sep. 30, 1983, Ser. No. 537,514

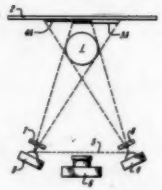
Int. Cl.⁴ G02B *27/22*

U.S. Cl. 350—144 **13 Claims**

1. A system for forming a representation having three-dimensional characteristics of an object comprising,

energy source means for directing energy onto said object from a plurality of points spaced apart from one another whereby said energy may be reflected and detected to form an image of said object having shadows formed by said energy eminating from said plurality of points,

means for detecting said reflected energy in the form of said image, with the energy from different ones of said points defining separable shadows,



and means for optically segregating for viewing separately by each of a viewer's eyes said separable shadows of said detected image.

4,714,320

DISPLAY SYSTEMS

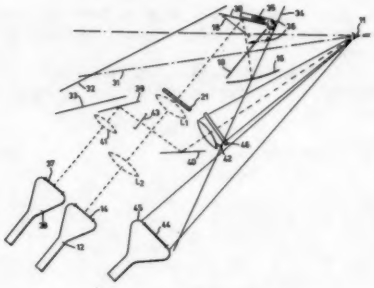
John R. Banbury, Fleet, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Continuation of Ser. No. 308,192, Aug. 21, 1981. This application Dec. 3, 1984, Ser. No. 677,329

Claims priority, application United Kingdom, Aug. 21, 1980, 8027278; Jul. 8, 1981, 8121142

Int. Cl.⁴ G02B *27/14*; G09G *3/02*

U.S. Cl. 350—174 **8 Claims**



1. A head-up display system comprising:

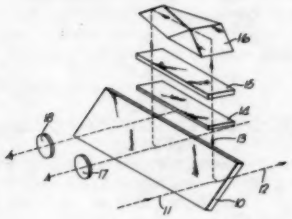
means providing a display object and a HUD optical relay means for forming a real image of the display object and together defining an optical axis, the HUD optical relay means including two lens systems each having at least one optical surface axially separated from one another; and

associated collimated monitor means including means providing a monitor object, monitor optical relay means for forming a real image of the monitor object, a monitor collimator for producing a collimated image of the monitor object at the observer's viewing position and first and second reflectors for directing light from the monitor optical relay to the monitor collimator; the monitor object and the first reflector being located on the opposite side of the said optical axis with respect to the second reflector and the monitor collimator and the first reflector being so located as to direct light from the monitor optical relay across the optical axis between the two lens systems; and axial separation of the two lens systems being sufficient not to obstruct the monitor means.

4,714,321
OPTICAL VIEWING APPARATUS

Sillitto: Hillary G., Edinburgh, Scotland, assignor to Ferranti Plc, Cheadle, England

Filed Jul. 28, 1986, Ser. No. 889,631
Claims priority, application United Kingdom, Aug. 6, 1985, 8519730
Int. Cl.[4] G02B *27/14*
U.S. Cl. 350—174 9 Claims

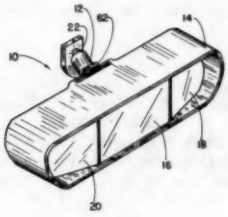


1. Optical viewing apparatus having means for permitting the viewing of an external target along a sight-line by a sensing device and for projecting a beam of laser radiation towards the target, which includes a viewing window having two surface and transparent to radiation at a wavelength to which the sensing device is sensitive arranged at an angle to the sight-line and having a viewing area through which the target may be viewed by the sensing device and a laser output area through which the beam of laser radiation passes, an anti-reflection coating on that surface of the viewing window remote from the target, and optical deflection means for deflecting laser radiation reflected from the other surface of the viewing window in the laser output area into the viewing area for reflection by the other surface of the viewing window into the field of view of the sensing device to form an aiming mark.

4,714,322
REAR VIEW MIRROR WITH DAY/NIGHT SETTING AND ADJUSTABLE PANORAMIC VIEW

Charles Cook, 4001 N. Chapman, Shawnee, Okla. 74801

Filed Mar. 3, 1986, Ser. No. 835,751
Int. Cl.[4] B60R *1/04;* G02B *17/00*
U.S. Cl. 350—281 2 Claims

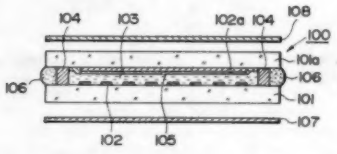


1. A rear view mirror assembly comprising:
(a) a support member adapted to fasten to and be suspended to the center of the windshield terminating in an adjustable ball and socket coupling displaced away from the windshield;
(b) a mirror housing;
(c) an over center means pivotally attached to said mirror housing through an upper and a lower axis and further attached between said upper and lower axis to said support member through said adjustable ball and socket coupling such that the selection of positions of the over center means displaces the lower axis and housing relative to the upper axis creating a selectable change in the tilt of said housing;
(d) a plurality of prismoidal mirror segments sequentially positioned within said mirror housing with the centrally located mirror segment rigidly fixed to said housing and each successive mirror segments vertically hinged to said adjacent mirror segments within said housing; and
(e) a plurality of adjustable means each threadably attached to said housing and one of said successive hinged mirror segments such as to adjust said hinged mirror segments relative to said housing and thereby direct said hinged mirror segment towards a desired direction of view.

4,714,323
FERROELECTRIC LIQUID CRYSTAL DEVICE HAVING CHIRAL SMECTIC AND NEMATIC LIQUID CRYSTAL COMPOSITION

Kazuharu Katagiri, Tama; Kazuo Yoshinaga, Tokyo; Shinjiro Okada, Kawasaki, and Junichiro Kanbe, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 6, 1985, Ser. No. 773,222
Claims priority, application Japan, Sep. 11, 1984, 59-191162
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—350 S 27 Claims



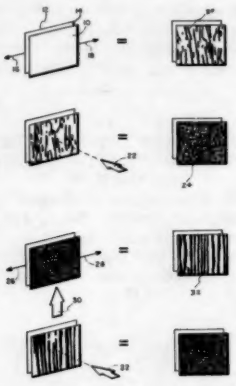
1. A liquid crystal apparatus comprising:
(a) a liquid crystal device comprising a plurality of picture elements arranged in a plurality of rows and columns, each picture element comprising a pair of oppositely spaced electrodes and a ferroelectric liquid crystal having a first optically stable state and a second optically stable state disposed between the pair of oppositely spaced electrodes, said ferroelectric liquid crystal being a composition comprising a liquid crystal compound showing at least nematic phase and a liquid crystal compound showing at least chiral smectic phase; and
(b) means for applying either one of a first voltage signal exceeding a first threshold voltage of the ferroelectric liquid crystal and a second voltage signal exceeding a second threshold voltage of the ferroelectric liquid crystal to the picture elements on a row for orienting the ferroelectric liquid crystal to either one of the first and second optionally stable states.

16. A liquid crystal apparatus comprising:
(a) a liquid crystal device comprising a plurality of picture elements arranged in a plurality of rows and columns, each picture element comprising a pair of oppositely spaced electrodes and a ferroelectric liquid crystal having a first optically stable state and a second optically stable state disposed between the pair of oppositely spaced electrodes, said ferroelectric liquid crystal being a composition comprising a liquid crystal compound showing at least nematic phase and a liquid crystal compound showing at least chiral smectic phase; and
(b) means for applying a first voltage signal for orienting the ferroelectric liquid crystal to the first optically stable state to a selected picture element on a row of picture elements, and a second voltage signal for orienting the ferroelectric liquid crystal to the second optically stable state to the remaining picture elements on the row.

4,714,324
APPARATUS UTILIZING DISPERSION SHEAR

Richard J. McClure, and Frederick J. Jeffers, both of San Diego, Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 19, 1985, Ser. No. 777,652
Int. Cl.[4] G02B *26/02*
U.S. Cl. 350—362 8 Claims



1. Apparatus for use with a dispersion of magnetic particles, said apparatus comprising

a. first and second spaced apart means for receiving said dispersion of magnetic particles therebetween,

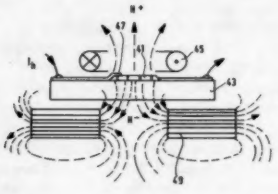
b. drive means for relatively moving said first and second means to impart shearing forces to said dispersion of said magnetic particles, and

c. means for applying a magnetic field perpendicular to the plane of shear experienced by said dispersion, the strength of said field being sufficient to orient similarly the dipoles associated with said particles and thereby cause said particles to repel mutually each other to effect a nigh perfect dispersion thereof.

4,714,325
MAGNETO-OPTICAL PRINTING HEAD AND METHOD OF GREY-SCALE IMAGE GENERATION USING SUCH A PRINTING HEAD

Bernhard Hill, Aachen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 12, 1985, Ser. No. 775,190
Claims priority, application Fed. Rep. of Germany, Sep. 27, 1984, 3435426
Int. Cl.[4] G02F *1/09*
U.S. Cl. 350—376 10 Claims

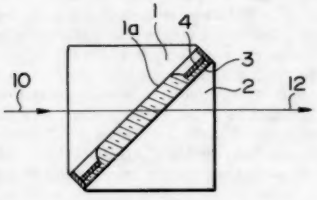


1. Magneto-optical printing head for generating a picture in the form of at least one line of light spots, comprising a light source, an imaging optical system and, situated between the source and imaging optics, a magneto-optical light-switching mask with light-switching elements, which by means of heat pulses selectively generated from thin-film resistors applied to the light-switching elements, and by means of a coil generating a magnetic field can be thermomagnetically switched between two possible states with the direction of magnetisation either parallel or antiparallel to the surface normals, characterized by an arrangement situated close to the light-switching elements for generating a static magnetic field in one direction, said coil generating a switchable magnetic field in the opposite direction, whereby the light-switching elements within a line cycle can be individually switched on in n possible steps by the single switching of all light-switching elements into a (first) starting state by the action of the magnetic field generated with the coil and subsequent individual switching of each light-switching element into the second state by the action of heat pulses at n−1 points of time and of the static magnetic field.

4,714,326
METHOD AND ELEMENT FOR OPTICAL MODULATION

Masayuki Usui, Yokohama; Hiroyuki Imataki, Kawasaki; Takashi Serizawa; Takeshi Baba, both of Yokohama, and Hiroyasu Nose, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1985, Ser. No. 706,269
Claims priority, application Japan, Mar. 5, 1984, 59-41837
Int. Cl.[4] G02B *26/00*
U.S. Cl. 350—485 17 Claims



1. An optical modulation method comprising:

providing a transparent member having a surface,

providing an elastomeric body disposed spaced apart from the surface,

providing a pressing member having an opening substantially in contact with the elastomeric member,

irradiating the surface with a light beam; and

causing the protrusion of the elastomeric body out of the opening of the pressing member to contact the surface so that the proportion of the light beam transmitted through the surface is changed.

4,714,327
OBLIQUE OBSERVATION ATTACHMENT FOR MICROSCOPES

Charles H. Marshall, Washington, D.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 14, 1986, Ser. No. 839,489
Int. Cl.[4] G02B *21/18*
U.S. Cl. 350—504 11 Claims

1. An oblique observation attachment for use in conjunction with a microscope operable in a three axis (X, Y, Z) cartesian coordinate system to provide normal and oblique optical inspection of populated planar subjects, comprising:

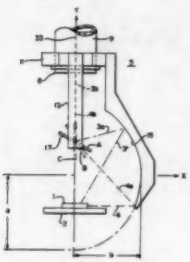
a retaining ring means positioned around said microscope parallel to said X axis and perpendicular to said Y axis operable to attach said oblique observation attachment to said microscope and further operable to maintain said oblique observation attachment on a common colinear axis with the objective lens of said microscope;

a support ring means positioned around said retaining ring means encircling same, said support ring means parallel to said X axis and perpendicular to said Y axis said support

ring means operable to support said oblique observation attachment;

at least one planar reflective means support member interconnected to said support ring positioned parallel to said Y axis and perpendicular to X axis operable to support a planar reflective means;

a planar reflective means interconnected to said planar reflector means support member positioned on a common colinear axis with said objective lens of said microscope operable to be pivoted about a point upon said planar reflective means member through 360° of rotation about the Z axis and further operable to reflect optical energy;



an X-Y stage positioned beneath said planar reflective means on a common colinear axis with said planar reflective means and said objective lens of said microscope, said X-Y stage operable to hold and support said populated planar subjects;

and a plano-elliptical reflective means positioned parallel to said Y axis and perpendicular to said X axis, said plano-elliptical reflective means operable to receive and reflect optical energy from said populated planar subject held by said X-Y stage and further operable to reflect said optical energy to said planar reflective means whereby said optical energy is then reflected to said objective lens of said microscope by said planar reflective means.

4,714,328

OPERATING MICROSCOPE APPARATUS

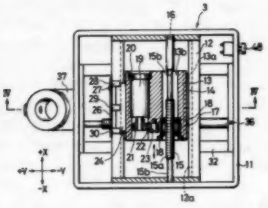
Naoyuki Takahashi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 666,124, Oct. 29, 1984, abandoned, which is a continuation of Ser. No. 326,652, Dec. 2, 1981, abandoned. This application Jul. 16, 1986, Ser. No. 884,668

Claims priority, application Japan, Dec. 4, 1980, 55-171332

Int. Cl.[4] G02B *21/24*

U.S. Cl. 350—521 **7 Claims**



1. An operating microscope apparatus comprising a stand, a supporting arm mounted slidable and rotatably on said stand, a fitting shaft supported rotatably on said supporting arm, and a microscope assembly moving device fixed to said fitting shaft and mounting a microscope assembly, said microscope assembly moving device comprising a case supporting thereon said microscope assembly, a first member fixed to said fitting shaft, a second member slidably at touched to said case and mounted movably on said first member, a third member fixed to said second member, and a fourth member secured to said case and movable to said third member and movable in the direction perpendicular to the moving direction of said second member.

4,714,329

VISUAL AID ESPECIALLY FOR WEAK-SIGHTED PERSONS

Lars Hellström, Mölndal, Sweden, assignor to N.V. Optimed, Izegem, Belgium

Filed Oct. 7, 1985, Ser. No. 785,252

Claims priority, application Sweden, Oct. 9, 1984, 8405034

Int. Cl.[4] G02C *1/00*; G02B *25/00*

U.S. Cl. 351—158 **4 Claims**

1. A visual aid for a particular weak-sighted person to improve the vision of the person, comprising a pair of spectacle glasses, having a spectacle glass positioned in front of each eye, to be worn by the weak-sighted person as a vision aid, each spectacle glass having an opening therein, the shape of which matches the exterior shape of a sleeve, into which sleeve at least one lens is interchangeably fitted having particular desirable optical properties for the particular eye in front on which the sleeve and lens are positioned in the spectacle glass, said at least one lens being interchangeable with other lenses to compensate for changes in the desirable optical properties for the particular eye, and the position of each sleeve in each spectacle glass being adjustable by sliding of the sleeve within its corresponding opening until a particular desirable ophthalmic position of the sleeve in front of the eye is selected, at which the sleeve is positioned within its corresponding opening in the spectacle glass such that the visual aid can be adjusted to improve the vision of the person by changing lenses and also by adjustably sliding and positioning the sleeve in its corresponding opening.

4,714,330

DEVICE FOR DETECTING AND/OR MEASURING VISUAL DEFICIENCIES

Jean-Claude Hennequin, Lizy sur Ourco, France, assignor to Essilor Internationale, Creteil, France

Filed Sep. 4, 1985, Ser. No. 772,327

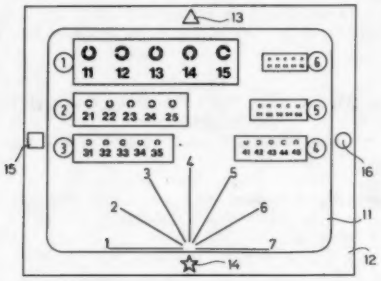
Claims priority, application France, Sep. 7, 1984, 84 13766

Int. Cl.[4] A61B *3/02*

U.S. Cl. 351—239 **6 Claims**

1. A device for measuring the level of visual acuity of a patient, comprising a test image which is adapted to be presented to the patient and which includes a plurality of visual acuity test sign series in which the test signs of each one of said series are so dimensioned that they correspond to a visual acuity level which is different from that of the test signs of any other one of said series, said series being so disposed in succession that each one of said test sign series corresponds to a visual acuity level higher by a predetermined increment than the visual acuity level to which corresponds the preceding test sign series, wherein said test signs are identified by different respective reference signs, each one of said reference signs

being located at close proximity to the test sign which it identifies, and wherein the reference signs identifying respectively



the test signs of any selected one of said series are so dimensioned that they correspond to the lower visual acuity level of the series immediately preceding said selected series.

4,714,331

METHOD AND APPARATUS FOR AUTOMATIC FOCUSING

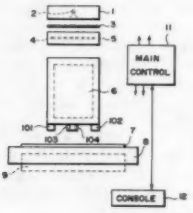
Kazuyuki Oda, Kawasaki; Yoshikiyo Yui, Kawasaki; Yoshiharu Kataoka, Kawasaki, and Hideo Hata, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1986, Ser. No. 843,392

Claims priority, application Japan, Mar. 25, 1985, 60-058534; Apr. 3, 1985, 60-069178; May 9, 1985, 60-096677; May 13, 1985, 60-099509; May 13, 1985, 60-099510; May 13, 1985, 60-099511; Jun. 18, 1985, 60-130859; Jun. 18, 1985, 60-130860; Oct. 17, 1985, 60-230027

Int. Cl.[4] G03B *27/34*

U.S. Cl. 353—122 **34 Claims**



1. A distance calculating device, comprising:

distance measuring means for measuring the difference between a surface of an object and a predetermined plane;

storing means having portions corresponding respectively to said distance measuring means, for storing information as to the effectiveness of each of measured distances by said distance measuring means, respectively, in accordance with points of measurement on the surface of the object; and

means for calculating the distance between the surface of the object and the predetermined plane by reference to said storing means and by use of only an effective, distance, of said measured distances, in accordance with the points of measurement on the surface of the object.

4,714,332

FILM DATA READING DEVICE

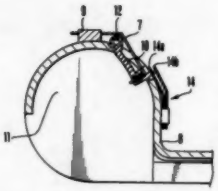
Masaharu Eguchi; Yoichi Tosaka; Ichiro Ohnuki, all of Tokyo; Yoshihiko Aihara, and Akira Ishizaki, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1985, Ser. No. 783,847

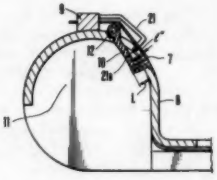
Claims priority, application Japan, Oct. 8, 1984, 59-209827; Dec. 24, 1984, 59-272543

Int. Cl.[4] G03B *7/24*

U.S. Cl. 354—21 **9 Claims**



G.11A



1. A film data reading device, comprising:

(a) contact means arranged to read a film data by coming into contact with a data code part formed on a film cartridge, said contact means being arranged to be freely protrusible into and retractable from a cartridge loading chamber; and

(b) protecting means arranged to encompass at least a portion of said contact means, said protecting means being arranged also to be freely protrusible into and retractable from said cartridge loading chamber, wherein said contact means is arranged to be not protruding from said protecting means toward the inside of said cartridge loading chamber when said chamber is not loaded with a film cartridge.

2. A film data reading device, comprising:

(a) contact means arranged to read a film data by coming into contact with a data code part formed on a film cartridge, said contact means being arranged to be freely protrusible into and retractable from a cartridge loading chamber;

(b) protecting means arranged to encompass at least a portion of said contact means, said protecting means being arranged also to be freely protrusible into and retractable from said cartridge loading chamber; and

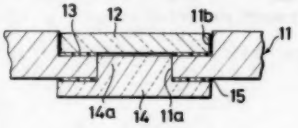
(c) detecting means for detecting loading of a film cartridge, said detecting means being arranged to detect the movement of said contact means and that of said protecting means when said chamber is loaded with a film cartridge.

4,714,333

WATER-PROOF WINDOW STRUCTURE OF WATER-PROOF CAMERA

Hideo Tamamura, and Hiroshi Maeno, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 31, 1985, Ser. No. 761,187
Claims priority, application Japan, Aug. 4, 1984, 59-119990[U]
Int. Cl.[4] G03B 17/08
U.S. Cl. 354—64 9 Claims



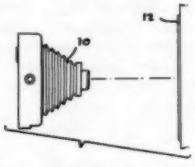
8. A camera, comprising:
(A) a camera body;
(B) a first member arranged on one side of the camera body by insert molding;
(C) second members arranged on another side of the camera body having about 90° angle relative to one side, said second members being cemented together from the inner and outer sides of the camera body in such a manner as to hold the camera body therebetween.

4,714,334

METHOD OF COLOR PHOTOGRAPHY OF BLACK AND WHITE OBJECT

Clarence C. Edwards, 4256 E. Capitol St., Washington, D.C. 20019

Continuation of Ser. No. 895,901, Aug. 12, 1986. This application Nov. 25, 1986, Ser. No. 935,639
Int. Cl.[4] G03B 17/50, 29/00
U.S. Cl. 354—76 8 Claims



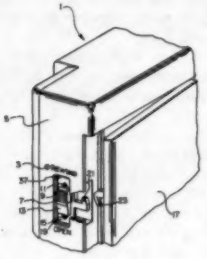
1. The method of providing a color photographic image of a continuous tone object comprising:
(a) providing color film of the type comprising a support and plural emulsions each sensitive to a different color and a separable sheet carrying developer for the emulsions, the development of the said plural emulsions being in timed sequence after activation of the developer,
(b) exposing a continuous tone object onto said color film,
(c) initiating the activation of the developer, and
(d) separating said separable sheet from said emulsions prior to full development to thereby stop development and to obtain a print of color different than a fully developed print.

4,714,335

CAMERA WITH DOOR RELEASE AND FILM REWIND INTERLOCK

Stephen G. Malloy Desormeaux, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 2, 1986, Ser. No. 881,307
Int. Cl.[4] G03B 1/00, 17/02
U.S. Cl. 354—214 8 Claims



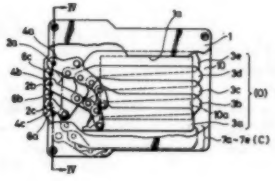
1. An improved photographic camera of the type wherein (a) a rewind member is manually movable from an original position to a rewind position to initiate automatic rewinding of an exposed filmstrip back into a light-tight cartridge in said camera and (b) a release member is manually movable from a latch position for securing a rear door of said camera closed to a release position for releasing said door to permit the door to be opened in order to remove the cartridge from said camera, and wherein the improvement comprises:
means for supporting said rewind member and said release member substantially adjacent each other when the rewind member is in its original position and the release member is in its latch position and for supporting said rewind member and said release member spaced from each other when the rewind member is in its rewind position and the release member is in its latch position; and
means for preventing said release member from being manually moved to its release position when said rewind member and the release member are adjacent each other and for allowing said release member to be manually moved to its release position when said rewind member and the release member are spaced from each other, whereby said rear door is safeguarded against being opened before automatic rewinding of an exposed filmstrip is initiated.

4,714,336

FOCAL PLANE SHUTTER FOR CAMERAS

Akira Suzuki, Itabashi, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Jun. 13, 1986, Ser. No. 874,152
Claims priority, application Japan, Jun. 14, 1985, 60-89588[U]
Int. Cl.[4] G03B 9/40
U.S. Cl. 354—246 5 Claims



1. A focal plane shutter for cameras including a base plate having an exposure aperture therein and an opening blade assembly and closing blade assembly arranged on said base

plate to open and close the exposure aperture, at least one of said opening blade assembly and closing blade assembly comprising:

a light interrupting blade group including first shutter blades and a second shutter blade partly overlapping one of said first shutter blades to open and close the exposure aperture,

a first arm pivoted on said base plate and pivoted to said first shutter blades and second shutter blade respectively at different positions to support said first shutter blades and second shutter blade,

a second arm pivoted on said base plate and pivoted to said first shutter blades respectively at different positions to form a parallel link mechanism in cooperation with said first arm, and

a third arm pivoted on said base plate and pivoted to said second shutter blade respectively at different positions to form a parallel link mechanism in cooperation with said first arm,

said first arm being pivoted on said base plate by fitting a shaft standing on said base plate into a bearing sleeve carrying said first arm, and

said second arm and third arm being pivoted on said base plate by fitting shafts provided in said base plate respectively into holes made in said second arm and third arm.

4,714,337

SAFETY MEANS FOR PROCESS KIT

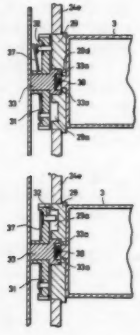
Fumio Nishino, Tokyo; Shigeyoshi Onoda, Yokohama; Akihiro Nomura, Kawasaki; Morikazu Mizutani, Tokyo; Shinji Kanemitsu, Ichikawa, and Mototada Toriumi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 849,185, Apr. 7, 1986, abandoned, which is a division of Ser. No. 450,210, Dec. 16, 1982, Pat. No. 4,591,258. This application Dec. 2, 1986, Ser. No. 937,476

Claims priority, application Japan, Dec. 22, 1981, 56-208489; Mar. 5, 1982, 57-35626; May 14, 1982, 57-81763; May 17, 1982, 57-82649

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 DR **8 Claims**



1. A process unit mountable into and demountable from a main assembly, comprising:

an image bearing member rotatable about a rotational axis thereof;

process means actable on said image bearing member;

a casing for supporting said process means and for rotatably supporting said image bearing member;

a member for receiving a rotational drive force from the main assembly to rotate said image bearing member when said unit is mounted in the assembly;

an electrically conductive member provided at the rotational axis of said image bearing member, for sliding contact with an electrically conductive member of said main assembly to electrically connect said conductive shaft with the conductive member of the main assembly.

4,714,338

ELECTROSTATIC COPYING APPARATUS

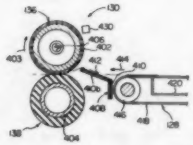
Kazumi Iida, Matsubara; Yosuke Ohata, Habikino; Keiichiro Hyodo, Kobe; Kazunori Akiyama, Takatsuki; Tadashi Umeda, Takada, and Keiichi Kishimoto, Nara, all of Japan, assignors to Mita Industrial Co. Ltd., Osaka, Japan

Division of Ser. No. 596,121, Apr. 3, 1984, Pat. No. 4,636,057. This application Jun. 20, 1986, Ser. No. 876,606

Claims priority, application Japan, Apr. 12, 1983, 58-63051

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 FU **4 Claims**



1. An electrostatic copying apparatus comprising:

a fixing device with an electrical heating element,

a temperature detecting means for detecting temperature at a predetermined location with respect to the fixing device and providing a temperature signal representative of the temperature at said location,

a copying cycle signal producing means for producing a copying cycle signal when copying is to be prformed,

a power supply switch, and

control means responsive to the temperature signal and to the copying cycle signal for controlling the electrical heating element and the state of the power supply switch; wherein said control means, upon the closing of the power supply switch, causes the electrical heating element to energize until the temperature detecting means provides a temperature signal representing a first predetermined temperature T_1 suitable for fixation, and thereafter, when the copying cycle signal producing means produces the copying cycle signal, said control means controls the energization and deenergization of the electrical heating element on the basis of whether the temperature detected by the temperature detecting means is the first predetermined temperature T_1, and wherein when the copying cycle signal producing means does not produce the copying cycle signal and the temperature detecting means provides a temperature signal representing a temperature decrease to a second predetermined temperature T_2 below the first predetermined temperature T_1, said control means deenergizes the electrical heating element and causes the power supply switch to assume an off state, the second temperature T_2 providing for reliable fixation in an immediately started copying cycle.

4,714,339

THREE AND FIVE AXIS LASER TRACKING SYSTEMS

Kam C. Lau, Gaithersburg, and Robert J. Hocken, Barnesville, both of Md., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Feb. 28, 1986, Ser. No. 834,728

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—4.5 **15 Claims**

7. A laser tracking system, comprising:

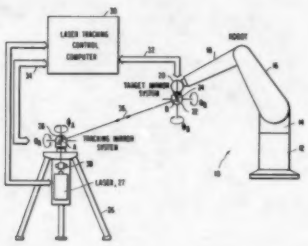
a laser light source associated with a tracking point (A) for producing a beam of coherent light;

a first rotatable planar reflector (**28**) associated with said

tracking point for reflecting said beam from said laser light source into a first beam;

a retroreflector (120) associated with a target point (B) for reflecting a beam incident thereupon into a second beam anti-parallel to said incident beam, said tracking point and said target point being separated by a separation;

control means for controlling said first reflector to direct said first beam to said retroreflector at said target point, said control means controlling said first reflector to rotate



in at least two degrees of freedom, said control means including means (128) associated with said tracking point for determining the planar position of a light beam falling thereupon and receiving said second beam;

angular measuring means for measuring said at least two degrees of freedom; and

interferometric means (124,48) associated with said tracking point for measuring said separation by interfering said light beam from said laser light source before it is reflected by said first reflector.

4,714,340

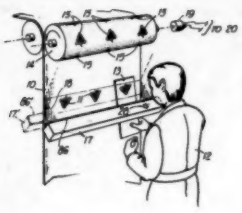
METHOD AND APPARATUS FOR INSPECTING HIGH SPEED CONVERTED WEB

W. C. Stillwagon, 7610 Bell Mill Rd., Dunwoody, Ga. 30338

Continuation of Ser. No. 674,098, Nov. 23, 1984, abandoned. This application Feb. 25, 1987, Ser. No. 18,597

Int. Cl.[4] G01P *3/40*

U.S. Cl. 356—23 **19 Claims**



1. A method of inspecting a high speed printed web having spaced repetitive impressions printed thereon, comprising the steps of:

translating said web past a flash tube assembly including at least one flash tube adapted to be stroboscopically excited;

generating trigger pulses which in a first mode of operation are synchronized at a frequency determined by the movement of the web, and in a second mode of operation continue to be synchronized with the web but are periodically advanced in a controlled manner;

exciting said at least one flash tube with the trigger pulses to produce light flashes; and

directing said light flashes to one surface of the web whereby a stroboscopic effect is produced, such that in said first mode of operation a virtually stationary or locked image of the impression on the web is produced and in said second mode of operation a panned or scrolled image of the impression on the web is produced which is incrementally advanced but which remains synchronized to the web between said advancements.

4,714,341

MULTI-WAVELENGTH OXIMETER HAVING A MEANS FOR DISREGARDING A POOR SIGNAL

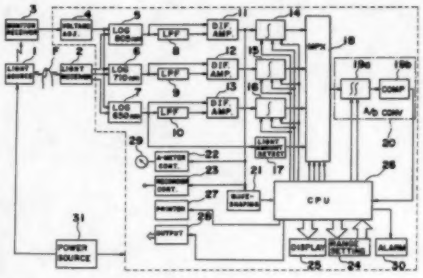
Kenji Hamaguri, Minamikawachi, and Takao Sakai, Habikino, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 21, 1985, Ser. No. 704,772

Claims priority, application Japan, Feb. 23, 1984, 59-33952; Mar. 12, 1984, 59-47769

Int. Cl.[4] G01N *33/16*

U.S. Cl. 356—41 **12 Claims**



1. An oximeter for measuring oxygen saturation in arterial blood comprising:

light source means for projecting light to a body member to be measured;

light responsive means for receiving the light which has transmitted through said body member and for generating at least first, second and third signals at three different wavelengths;

calculating means for calculating at least first oxygen saturation data using first and second signals and second oxygen saturation data using first and third signals;

determining means for determining whether or not a difference between said first and second oxygen saturation data is within a predetermined level; and

means for designating said first and/or second oxygen saturation data as valid when said difference is within said predetermined level, and as invalid when said difference is not within said predetermined level.

4,714,342

FIBER OPTICAL INTERFEROMETRIC TEMPERATURE SENSOR WITH RAMP MODULATION

David A. Jackson, Canterbury, England; Michael Corke, Wheaton, Ill., and Alan D. Kersey, Washington, D.C., assignors to Kent Scientific and Industrial Projects Limited, Kent, England

PCT No. PCT/GB84/00138, § 371 Date Dec. 18, 1984, § 102(e) Date Dec. 18, 1984, PCT Pub. No. WO84/04385, PCT Pub. Date Nov. 8, 1984

PCT Filed Apr. 24, 1984, Ser. No. 684,925

Claims priority, application United Kingdom, Apr. 21, 1983, 8310835

Int. Cl.[4] G01J *5/38;* **G01B** *9/02*

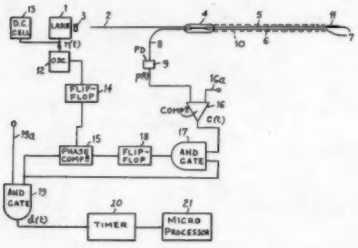
U.S. Cl. 356—44 **7 Claims**

1. An optical temperature sensor comprising:

an all-fiber Michelson interferometer,

said interferometer comprising an input and an output, a signal optical fiber and a reference optical fiber formed

from single mode optical fiber and having unequal lengths to provide optical path length imbalance, said signal and reference optical fibers having proximal ends for coupling to said input and output and distal ends remote therefrom, said distal ends being adapted to reflect light beams propagated in said signal and reference optical fibers back towards said proximal ends thereof, means defining a temperature sensing zone of said signal optical fiber at and adjacent said distal end thereof, and directional coupling means coupling said input and output of said interferometer to said proximal ends of said signal and reference optical fibers, said directional coupling means being adapted to mix said light beams reflected back to said proximal ends of said signal and reference optical fibers to produce an interference pattern at said output of said interferometer corresponding to the optical phase shift between said light beams respectively propagated in said signal and reference optical fibers which phase shift is related to the temperature at said sensing zone of said signal optical fiber,



a laser light source controlled by a laser injection current,

means coupling said laser light source to said input of said interferometer, whereby said directional coupling means injects light from said laser light source into said proximal ends of both said signal and reference optical fibers to propagate said light beams therein,

means for modulating said laser injection current with a modulation signal to produce a moving said interference pattern at said output of said interferometer,

photodetector means for monitoring said moving interference pattern at said output and producing a photodetector output signal corresponding thereto, and

means for processing said photodetector outputs signal with respect to time for continuously monitoring a predetermined time period related to the movement of said interference pattern, whereby to derive a signal identifying the temperature detected at said sensing zone of said signal optical fiber.

4,714,343

OPTICAL FIBER CHARACTERISTIC MEASUREMENT

Takashi Ide, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 4, 1986, Ser. No. 848,229

Claims priority, application Japan, Apr. 15, 1985, 60-80003

The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.

Int. Cl.[4] G01N *21/84*

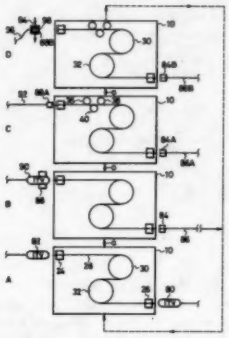
U.S. Cl. 356—73.1 **24 Claims**

1. A single mode optical fiber characteristic measuring device comprising:

a set stage for setting an optical fiber under measurement on a carrier and

measuring stages for measuring characteristics of said optical fiber on said carrier arranged successively in the direction of movement of said carrier, each measuring stage having optical measuring systems incident and emergent ends, said carrier on which said optical fiber under measurement being adapted to be moved to said measuring stages successively, and at each of said measuring stages the two ends of said optical fiber under measurement being aligned with said optical measuring system incident and emergent ends, respectively, so that a characteristic measurement assigned to said stage is performed,

holders for holding the two ends of an optical fiber under measurement, and a first optical fiber bending unit adapted to accurately bend said optical fiber with a first radius of curvature in such a manner that the bend corresponds to



one circumference of a circle having said first radius of curvature, to control the propagation mode in said optical fiber being provided on said carrier, and

a second optical fiber bending unit adapted to bend said optical fiber under measurement with a second radius of curvature smaller than said first radius of curvature in such a manner that the bend corresponds to more than one circumference of the circle having said second radius of curvature is provided on said carrier or at a predetermined measuring stage or stages.

4,714,344

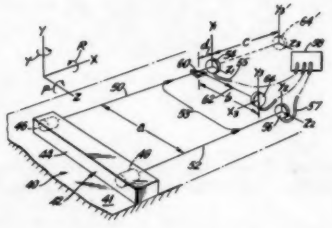
LASER APPARATUS FOR MONITORING GEOMETRIC ERRORS

Martin R. Hamar, 70 Linden Tree Rd., Wilton, Conn. 06897

Filed Apr. 24, 1986, Ser. No. 855,898

Int. Cl.[4] G01B *11/26;* G01C *1/00*

U.S. Cl. 356—152 **12 Claims**



1. A laser system for monitoring geometric errors, said system comprising:

a first lasing element operative to produce a first laser beam;

a second lasing element operative to produce a second laser beam such that the first and second laser beams are parallel;

a first target generally in line with the first laser beam and operative to produce a signal identifying the point of impingement of the first laser beam thereon;

a second target generally in line with the second laser beam

and operative to produce a signal defining the point of impingement of the second laser beam thereon;

a beam splitter disposed intermediate said first lasing element and said first target, said beam splitter being operative to permit a portion of the first laser beam to pass therethrough and impinge upon the first target and further being operative to divert a portion of the first laser beam therefrom;

a third target in line with the diverted portion of the first laser beam and operative to produce a signal defining the point of impingement thereon by the diverted portion of the first laser beam, the beam splitter and the first, second and third targets being fixedly mounted relative to one another with the distances of the beam splitter to the first and third targets respectively being unequal, such that the signals produced by the third target are identical to signals that would be produced by a target disposed along the portion of the first laser beam passing through the beam splitter but at a location spaced from the first target; and

control means operatively connected to the first, second and third targets, said control means being operative to receive the signals from the first, second and third targets and to calculate the geometric errors based on the received signals.

4,714,345

SAMPLE ARRANGEMENT FOR SPECTROMETRY, METHOD FOR THE MEASUREMENT OF LUMINESCENCE AND SCATTERING AND APPLICATION OF THE SAMPLE ARRANGEMENT

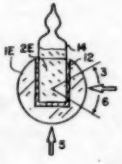
Bernhard Schrader, Soniusweg 20, 4300 Essen, Fed. Rep. of Germany 15

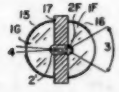
Filed Jun. 27, 1985, Ser. No. 749,882

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1984, 3424108

Int. Cl.[4] G01N *21/03, 21/05, 21/65*

U.S. Cl. 356—246 **8 Claims**





1. Sample arrangement for spectrometry, especially for Raman spectrometry, comprising an essentially spherical container of transparent solid material, and a sample at the center of the spherical container, said spherical container having an outer surface, light illuminated and light exiting portions of which define windows provided with anti-reflection coatings and having light reflecting layers on other surface portions of said outer surface of said spherical container, said container comprising two separate half spheres, the sample being provided in a separate sample holder serving to space apart said two half spheres and to maintain the sample between the half spheres of the container a the center thereof, the sample holder having an axis perpendicular to planar surfaces of the half spheres.

4,714,346

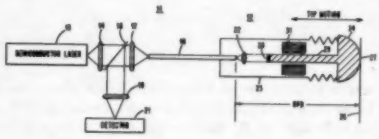
FREQUENCY CHIRPED INTERFEROMETRIC DISPLACEMENT SENSORS AND MECHANICAL TRANSLATION TIPS THEREFOR

Elliot Eichen, Arlington; Paul Melman, Newton, both of Mass., and Kenneth Cook, Troy, Mich., assignors to GTE Laboratories Incorporated, Waltham, Mass. and GTE Valeron Corporation, Troy, Mich.

Filed Sep. 22, 1986, Ser. No. 909,816

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—349 **11 Claims**



1. A mechanical translation tip for a frequency chirped interferometric displacement sensor comprising

a tip member having

a first surface adapted to engage a test surface,

a second surface having high reflectivity, and

an axial portion joining said surfaces;

an optical fiber having two ends;

a reference surface;

a lens;

a bearing in cooperation with said portion for axial movement of said tip member therewithin; and

housing means for engaging said tip member, said bearing, said fiber, said reference surface, and said lens therewithin, whereby

said housing means is adopted to translationally engage said member so that said first surface is external to said housing means and said second surface is internal to said housing means,

said bearing is fixedly held within said housing means for axial movement of said tip member therewithin, and

said fiber and said lens are so oriented within said housing means whereby some of the light entering one of said ends of said fiber travels through said fiber, exiting from the other of said ends, said exiting light from said other end being collimated by said lens and directed to said second surface, the collimated light from said lens being reflected back through said lens by said second surface of high reflectivity, the reflected back light being focused by said lens onto said other end of said fiber, the focused light being transmitted back through said one end of said fiber, and whereby the rest of the light traveling through said fiber is reflected back by said reference surface to said one end of said fiber.

4,714,347

OPTICAL SMOKE DETECTORS

Martin T. Cole, 29 Stafford St., Huntingdale, Victoria, Australia

Filed Aug. 13, 1984, Ser. No. 640,345

Claims priority, application Australia, Aug. 12, 1983, PG0822

Int. Cl.[4] G01N *21/53;* **F21V** *7/04*

U.S. Cl. 356—339 **6 Claims**

5. Apparatus for detecting impurities such as smoke in a gas, said apparatus comprising

(a) means forming a sampling chamber;

(b) inlet and outlet ports spaced from one another for flowing through said chamber gas to be sampled;

(c) a window in said chamber between said ports;

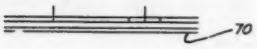
(d) a light source having an elongate component outside said chamber and adjacent said window for admitting into said chamber a first portion of light emitted from said source;

(e) reflector means; and

(f) means supporting said reflector means adjacent said

source for reflecting into said chamber a further portion of light emitted from said source;

(g) said reflector means including an elongate component



adjacent the corresponding component of said source and being configured to reflect into said chamber substantially all light emitted by said source other than said first portion.

4,714,348

METHOD AND ARRANGEMENT FOR OPTICALLY DETERMINING SURFACE PROFILES

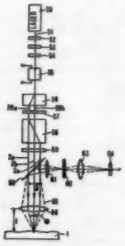
Gunter MaKosch, Sindelfingen-Maichingen, Fed. Rep. of Germany, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 11, 1986, Ser. No. 940,667

Claims priority, application European Pat. Off., Dec. 23, 1985, 85116503.5

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—351 **10 Claims**



1. A method of optically determining the profile of a surface comprising the steps of

illuminating said surface with a first light beam with substantially vertical incidence,

superposing said first light beam in the area of said surface with two coherent light beams that impinge symmetrically to the first light beam under selectable oblique angles of incidence to generate a three-beam interference field with a periodic intensity modulation in a vertical direction, and

measuring the intensity of the light emanating from selected areas of said surface.

4,714,349

PHOTOELECTRIC LENGTH OR ANGLE MEASURING INSTRUMENT

Erich Huber, Schoenberg/Geminde Kienberg, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

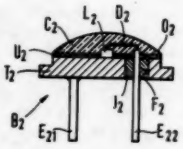
Filed Jul. 23, 1984, Ser. No. 633,337

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1983, 3327849

Int. Cl.[4] G01B *11/02, 11/26*

U.S. Cl. 356—374 **7 Claims**

1. In a photoelectric position measuring system for accurately measuring the relative position of two objects of the type comprising a graduation carrier adapted to be coupled to a first object, a graduation defined by the graduation carrier, and a scanning unit operative to scan the graduation and adapted to be coupled to a second object, the position of which is to be measured, the scanning unit comprising a scanning plate, a light emitting diode element positioned to illuminate the graduation, and at least one photosensor allocated to the scanning plate to scan the graduation, the improvement comprising:



the light emitting diode element situated on a carrier; and

the carrier comprising a light absorbing surface immediately surrounding the light emitting diode element, the carrier and light absorbing surface operative to substantially prevent light rays emerging laterally from the light emitting diode element from undergoing reflections off the carrier in the direction of the graduation and the scanning plate and thereby improve the accuracy of the relative position measurement.

4,714,350

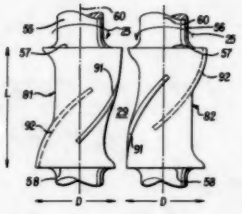
TWO-WING NON-INTERMESHING ROTORS OF INCREASED PERFORMANCE FOR USE IN INTERNAL BATCH MIXING MACHINES

Narku O. Nortey, Trumbull, Conn., assignor to Farrel Corporation, Ansonia, Conn.

Filed Oct. 31, 1986, Ser. No. 925,319

Int. Cl.[4] B29B *1/06;* **B01F** *7/02*

U.S. Cl. 366—84 **11 Claims**



1. For use in an internal mixing machine of the batch type, including housing means defining a mixing chamber shaped to accommodate two counter-rotating non-intermeshing winged rotors on parallel horizontal axes in said mixing chamber, said housing means having a closable inlet for introducing materials into the mixing chamber and a closable outlet for discharging the mixed materials from said mixing chamber, a pair of improved non-intermeshing two-wing rotors comprising:

first and second non-intermeshing rotors each having first and second wings, each wing having a wing tip of generally helical configuration,

said rotors having a ratio between their axial length L and their major diameter D in the range of 1.4 to 2.1,

said first wing on each rotor having its wing tip originating at a first end of the rotor at a zero angular position with respect to the rotor axis and having its wing tip oriented at a first helix angle A_1 in the range from 25° to 40°,

said second wing on each rotor having its wing tip originating at a second end of the rotor at an angular position with

respect to the rotor axis in the range from 176° to 184° and having its wing tip oriented at a second helix angle A_2 in the range from 35° to 55°,

said wing tip of said first wing having a twist angle T_1 in the range from 80° to 110°,

said wing tip of said second wing having a twist T_2 in the range from 90° to 120°,

said second helix angle A_2 being larger than said first helix angle A_1 in the range from 5° to 15°, and

said first and second rotors being adapted to be installed in such mixing chamber with the first end of the first rotor at the same end of said mixing chamber as the second end of the second rotor.

4,714,351

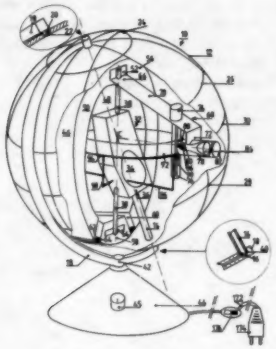
GLOBE MAPS AND DERIVED PRODUCTS

Jean-Paul Domen, 75 rue du Moulin Vert, 75014 Paris, France

Filed Sep. 23, 1986, Ser. No. 910,500

Int. Cl.[4] G04B *19/26, 19/22*

U.S. Cl. 368—17 **12 Claims**



1. A globe map with simulated sunlighting comprising a spherical shell with a translucent wall mounted on a support, said shell having an internal light source and a circular contour screen cooperating to create on said wall two substantially hemispherical zones respectively illuminated and dark and electromechanical clockworks designed to rotate said hemispherical zones around the center of said globe in accordance with the rhythm of the days and of the years, said clockworks having a body and two output shafts including a day shaft arranged along the axis of the poles and rigidly connected to said shell and a year shaft arranged along a diameter of said circular contour screen and rigidly connected to said screen, the axes of said shafts intersecting substantially at the center of said spherical shell along an angle substantially equal to the angle of inclination of the plane of the equator on the ecliptic, said screen comprising a central cavity designed to allow free passage of said body during the rotation of said screen around the axis of said year shaft.

4,714,352

ELECTRONIC DEVICE POWERED BY SOLAR CELLS

Wolfgang Ganter, Schramberg, Fed. Rep. of Germany, assignor to Junghans Uhren GmbH, Schramberg, Fed. Rep. of Germany

Filed Jul. 7, 1986, Ser. No. 882,462

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524290

Int. Cl.[4] G04B *1/00, 9/00;* **H02J** *7/00*

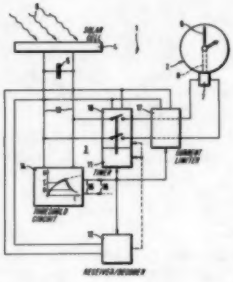
U.S. Cl. 368—64 **8 Claims**

1. An electrical apparatus for use in conjunction with means for converting radiant energy into electrical charge comprising:

a means for storing said charge, said means having a voltage corresponding to the amount of charge stored;

at least one means for consuming said charge stored by said storage means; and

threshold means responsive to said voltage of the storage means for enabling the charge stored in said storage means



to be applied to said consuming means when said voltage of the storage means exceeds a first predetermined value, the threshold means blocking the charge stored in said storage means from said consuming means when said voltage of the storage means is less than a second predetermined value that is less than said first predetermined value.

4,714,353

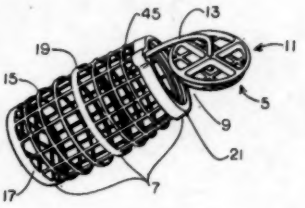
LAUNDERING BAG FOR PAIRED ITEMS

C. Mark Leaphart, 500 Zimalcrest Rd., Crossroad Apts., Columbia, S.C. 29210

Filed Aug. 6, 1986, Ser. No. 893,695

Int. Cl.[4] B65D *30/04*

U.S. Cl. 383—117 **12 Claims**



1. A laundering bag for paired items comprising:

an open weave fabric or plastic net;

a reinforcement structure maintaining said open weave fabric or plastic net in an uncollapsed state;

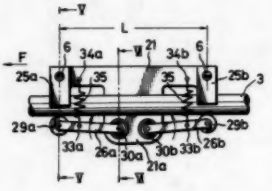
said reinforcement structure defining an opening at one end of said open weave fabric or plastic net and formed of a plurality of circular ribs; and

a means for closing said opening.

4,714,354
SUPPORT DEVICE FOR TRAVEL ASSEMBLY

Toyokazu Satomi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 20, 1985, Ser. No. 811,730
Claims priority, application Japan, Dec. 29, 1984, 59-276672; Dec. 29, 1984, 59-276673
Int. Cl.[4] F16C *29/00*
U.S. Cl. 384—38 **3 Claims**



1. A support device for supporting on a guide shaft a travel assembly moving along said guide shaft, comprising:

(a) at least two slide bearings equipped with V-shape grooves, fixed to said travel assembly and being in contact with said guide shaft so as to slidably move on said guide shaft; and

(b) rollers respectively disposed opposite said bearings across said guide shaft;

(c) arms supported on said travel assembly and supporting said rollers;

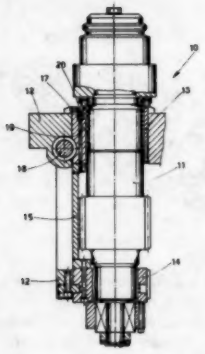
(d) one-way clutches coupling said arms and said travel assembly to permit the arms to rotate only in the direction in which they move the rollers toward the respective slide bearings; and

(e) elastic means biasing said rollers toward and into contact with said guide shaft, with relatively small elastic biasing force.

4,714,355
COMPENSATING DEVICE FOR ROLLING STANDS WITH ROLLS SUPPORTED AT ONLY ONE END

Alfredo Poloni, Ronchi Dei Legionari; Fausto Drigani, Zugliano Di Pozzuolo Del Friuli, and Roberto Canzutti, Percoto, all of Italy, assignors to Danieli & C. Officine Meccanichi SpA, Buttrio, Italy

Filed Mar. 12, 1986, Ser. No. 838,792
Claims priority, application Italy, Mar. 12, 1985, 83344 A/85
Int. Cl.[4] F16C *17/02*
U.S. Cl. 384—193 **6 Claims**



1. A roll for a rolling stand supported at only one end, comprising:

a shaft;

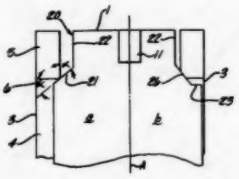
an upper and a lower bearing carrying the shaft;

a connection means between said upper bearing, which is slightly rounded longitudinally, and said lower bearing fixing said bearings to each other; and means providing a plurality of springs which allow said connection means to provide a resiliently yielding constraint between said upper bearing and said lower bearing to allow the upper bearing to follow deformation of the shaft; wherein said springs cooperate with screws to resiliently yieldingly secure said upper bearing to said lower bearing through said connecting means; wherein said springs are preloaded springs; wherein said springs are cup or Belleville springs; wherein said springs are lodged in the upper or lower portion of at least one of the bearings; and wherein said springs are located circumferentially.

4,714,356
COMPOSITE THRUST BEARING FORMED BY A RADIAL BEARING WITH AT LEAST ONE SEPARATE AXIAL THRUST COLLAR

Philippe Damour, St. Jean de la Ruelle; Alain Patoureau, Orleans, both of France; Jack J. Somma, Warren, and Ronald J. Thompson, Howell, both of Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed Apr. 18, 1986, Ser. No. 853,531
Claims priority, application France, Apr. 22, 1985, 85 06064
Int. Cl.[4] F16C *17/10*
U.S. Cl. 384—275 **6 Claims**



1. A composite thrust bearing for a rotary shaft comprising at least two members and wherein one such member is a radial half bearing in which the rotating shaft may be supported and rotate and the other such member is an axial thrust collar preventing axial movement of the shaft, said half bearing being of bimetallic strip including a bearing material on the radially inner surface and a steel backing member on the radially outer surface, one such member having a radially extending boss at each radial end thereof, said other member including a notch at each radial end, each said notch having an axially extending shoulder, each said boss extending radially and being received within a respective said notch and having a stop shoulder welded to said axially extending shoulder of each said notch, said axially extending shoulder of each said notch including a sloped shoulder portion in line contact with said boss stop shoulder prior to welding and meeting said stop shoulder at an included angle ranging approximately from 20° to 65° whereby the welding operation is faciliated by said line contact and whereby should the weld break the collar will be loosely retained on the radial half bearing as a result of the interengagement of the stop shoulder with the shoulder of said notch.

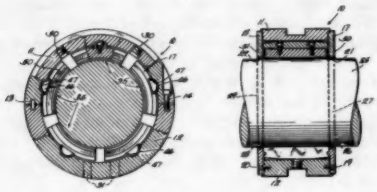
4,714,357
SEGMENTAL BEARING SHOE

Ronald W. Groth, Grafton, and Robert J. Nowakowski, Mequon, both of Wis., assignors to Orion Corporation, Grafton, Wis.

Filed Jun. 2, 1986, Ser. No. 869,276
Int. Cl.[4] F16C *17/03*
U.S. Cl. 384—312 **3 Claims**

1. A segmental bearing assembly that rotatably supports a

member comprising a housing having a plurality of recesses with each recess presenting an elongated concave surface; a bearing shoe body supported in the housing; a bearing surface on said body for engagement with the rotating surface of the member, separately fabricated elongated pivot removably mounted on the surface of said body that is opposite said bearing surface; a convex surface extending longitudinally of said pivot for engagement with the concave surface of said recess to enable the bearing shoe to pivot relative to the housing; and at least one fastener attaching said pivot to said body; a slot



formed in the surface of said body for receiving said pivot to secure said pivot in position on said body;

wherein the surface of said elongated pivot is semicircular in cross section, the outer extremity of said surface of said pivot being arced longitudinally to form a convex configuration along the length of the pivot, said convex configuration with radius of curvature, at all intervals, more than twice the length of that of the said semicylindrical surface, to enable the bearing shoe to rock in both directions so that is will align itself to accommodate the loading applied by the rotating member.

4,714,358

CAGE FOR LIPLESS ROLLER BEARINGS

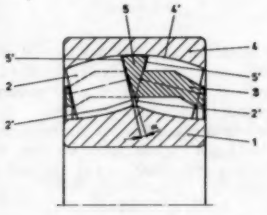
Oswald Bayer, Aidhausen; Martin Grehn, and Werner Planek, both of Dittelbrunn, all of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Jan. 28, 1986, Ser. No. 823,260

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1985, 3504059

Int. Cl.⁴ F16C *33/48*

U.S. Cl. 384—470 **6 Claims**



1. A cage for a lipless roller bearing having a plurality of rollers therein, the cage comprising

a support ring for supporting an end of each roller; the support ring having

a radially outward portion which is disposed toward the outer race of the bearing;

a radially inward portion;

side portions extending radially between the outward and inward portions, which oppose the supported ends of the rollers and define a lubrication-receiving space, between the support means and each supported roller end, which widens with distance from the outward portion toward the interior of the bearing; and

a substantially continuous side for supporting an end of more than one such roller; the support ring side and the corresponding opposed supported roller ends having substantially planar surfaces;

wherein said planar surfaces define an angle therebetween of about 10′ to 3°.

4,714,359

ROLLING BEARING ARRANGEMENT, IN PARTICULAR FOR WORK ROLLS IN HIGH-SPEED ROLLING MILLS

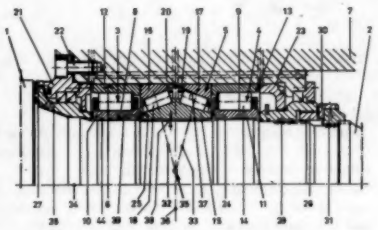
Heinrich Winter, and Walter Küfner, both of Schweinfurt, Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Feb. 25, 1987, Ser. No. 18,623

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3607729

Int. Cl.⁴ F16C *19/38*

U.S. Cl. 384—571 **9 Claims**



1. In a rolling bearing arrangement for supporting a journal of a work roll or the like by means of first and second cylindrical rolling bearings for carrying radial loads, each cylindrical rolling bearing having an outer ring means, an inner ring means and a first row of rolling bodies arranged therebetween, and by means of an inclined rolling bearing arranged between said first and second cylindrical rolling bearings for carrying axial loads in both axial directions, said inclined rolling bearing having an outer ring means, an inner ring means, and first and second rows of rolling bodies arranged therebetween, said outer ring means and said inner ring means of said inclined rolling bearing each having first and second raceways on which said first and second rows of rolling bodies respectively roll, whereby said outer ring means of said cylindrical and inclined rolling bearings are axially and radially fixedly arranged in series in a common bore of a rolling mill stand, said inner ring means of said cylindrical rolling bearings are axially and radially fixedly arranged on said journal, and said inner ring means of said inclined rolling bearing has first and second radial end surfaces which are respectively axially supported on opposing end surfaces of said inner ring means of said respective cylindrical rolling bearings, the improvement wherein:

(a) said first and second rows of rolling bodies of said inclined rolling bearing have radially inwardly directed lines of load transmission which intersect;

(b) said rolling bodies of said inclined rolling bearing are arranged to be displaced in both directions transverse to the rolling direction on at least one of the respective raceways;

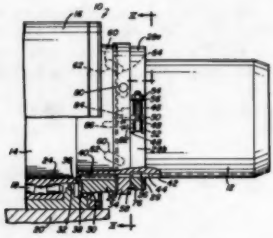
(c) said end surfaces of said inner ring means of said inclined rolling bearing are arranged to be slidably displaced in a substantially radial direction on said respective opposing end surfaces of said inner ring means of said cylindrical rolling bearings; and

(d) a radial play is provided between said inner ring means of said inclined rolling bearing and said journal which is greater than the radial play between said inner ring means of said respective cylindrical rolling bearings and said journal.

4,714,360
THRUST MECHANISM FOR MILL ROLL BEARING ASSEMBLY

Andrew Petros, 620 Oakdale Rd., Oakdale, Pa. 15071

Filed Oct. 6, 1986, Ser. No. 915,720
Int. Cl.[4] F16C *35/06*
U.S. Cl. 384—620 12 Claims



1. In a bearing thrust apparatus which is adapted to be received on the roll neck of the mill roll and is operable to selectively apply thrust loads to the roll bearings, the combination comprising:

a clamp ring adapted to be received coaxially on such a roll neck and releasably secured thereon in a fixed axial and rotary orientation with respect thereto;

a spacer ring adapted to be received coaxially on such a roll neck in rotationally fixed orientation with respect thereto and in axially movable relation with respect to said clamp ring;

said spacer ring including contact means for engaging such roll bearings to impart such axial thrust loads thereto;

a thrust ring adapted to be received coaxially on such a roll neck axially intermediate said spacer ring and said clamp ring and being axially rotatable with respect to such a roll neck;

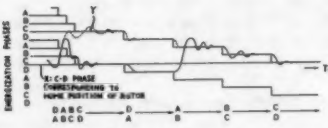
link means cooperable with said spacer ring and said thrust ring to impart axial motion to said spacer ring in response to axial rotation of said thrust ring to apply such thrust loads to such roll bearings; and

interengagement means cooperable with said thrust ring and said clamp ring to positively retain said thrust ring in any of a plurality of rotary positions thereof with respect to said roll neck.

4,714,361
STEPPER MOTOR HOMING METHOD AND SYSTEM

Kiyoshi Yamakawa, Komaki, and Satoshi Yoshimoto, Gifu, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 9, 1987, Ser. No. 23,792
Claims priority, application Japan, Mar. 11, 1986, 61-53090
Int. Cl.[4] B41J *1/30, 7/96*
U.S. Cl. 400—144.2 12 Claims



5. A combination comprising:

a stepping motor including windings for sequentially establishing a plurality of energization phases, and a movable element which is movable in opposite directions;

a motor driver circuit connected to said windings, for moving said movable element in one of said opposite directions, by repeating an energization cycle in which said windings are energized in a predetermined sequence at a predetermined energization interval from one energization phase to another;

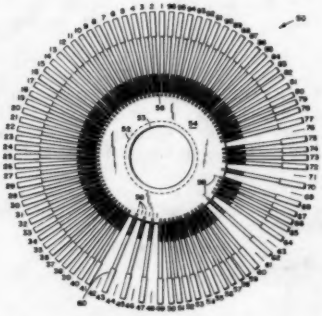
a mechanical blocking means for mechanically blocking said movable element from further moving from a predetermined home position in said one direction; and

homing control means operable after said movable element has been mechanically blocked by said mechanical blocking means, for activating said motor driver circuit to energize at least one of said windings which corresponds to at least one of said energization phases that precedes, in said predetermined sequence, another of said energization phases which corresponds to said predetermined home position of said movable element, said at least one of said windings being energized for a time span longer than said predetermined energization interval of said energization cycle, for each of said at least one energization phase preceding said another energization phase, said homing control means then activating said motor driver circuit to maintain said another energization phase, and thereby hold said movable element at said predetermined home position.

4,714,362
TYPEWRITER DAISY WHEEL

George Shrime, Dallas, Tex., assignor to Contitronix Inc., Garland, Tex.

Filed Jun. 11, 1982, Ser. No. 387,501
Int. Cl.[4] B41J *1/30*
U.S. Cl. 400—144.2 9 Claims



1. A daisy wheel for a printer having a plurality of petals with a character head on the end of each petal comprising:

(a) a plurality of equally spaced petal positions about the circumference of said daisy wheel, and

(b) pre-determined ones of said petals positioned on, before or after said equally spaced positions whereby such petals are irregularly spaced about the circumference of said daisy wheel.

4,714,363
PRINT CONTROL DEVICE FOR A DOT MATRIX PRINTER

Masahiro Minowa, Shiojiri, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed May 20, 1985, Ser. No. 736,481
Claims priority, application Japan, May 18, 1984, 59-100152; Mar. 14, 1985, 60-51011
Int. Cl.[4] B41J *19/30*
U.S. Cl. 400—322 12 Claims

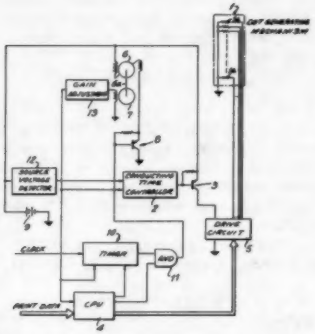
1. A print control device for use in a dot matrix printer, the dot matrix printer comprising a DC power source and a print generating mechanism which is moved along the length of a platen by DC motor coupled to the DC power source, the print control device comprising:

detecting means for responding to rotation of the DC motor to provide a synchronizing signal which is related to the angular position of the DC motor;

timer means responsive to the synchronizing signal to provide a signal for decoupling the DC motor from the DC power source for a predetermined period of time;

controller means responsive to the synchronizing signal for energizing the print generating mechanism during the predetermined period of time;

switch means coupled between the DC power source and the DC motor, the switch means responsive to the decoupling signal to cut off the supply of DC power to the motor;



gate means having a first input receiving the decoupling signal from the timer means, a second input, and an output coupling to the switch means; and

computer means having the synchronizing signal and a print data signal as inputs, the computer means having a print control signal as an output which is fed to the second input of the gate means, the gate means responding to the absence of a decoupling control signal and to the presence of a print signal to energize the DC motor.

4,714,364

AUTOMATICALLY RETURNED PAPER BALL ASSEMBLY OF A PRINTER

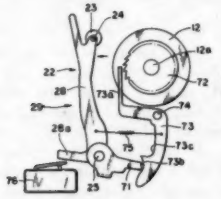
Hiromi Takada, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 9, 1985, Ser. No. 764,239

Claims priority, application Japan, Aug. 10, 1984, 59-166584; Aug. 10, 1984, 59-166585

Int. Cl.⁴ B41J *13/20*

U.S. Cl. 400—639.1 **7 Claims**



1. Apparatus for setting a sheet of paper in position around a rotatably supported platen roller, comprising:

a rotatably supported platen roller;

driving means for rotating said platen roller;

a paper bail assembly including at least one bail roller, said paper bail assembly being pivotally supported and capable of taking a set position where said bail roller is pressed against said platen roller, a first retracted position wherein said bail roller is separated away from said platen roller and a second retracted position where said bail roller is further separated away from said platen roller, said paper bail assembly being normally biased toward said set position;

position control means for controlling the position of said paper bail assembly, said position control means being operatively coupled to said paper bail assembly and said platen roller and temporarily holding said paper bail assembly in said first or second retracted position when said paper bail assembly is manually moved thereto;

detecting means for detecting said paper bail assembly when said paper bail assembly is manually moved to said second retracted position, and for generating a detection signal in response to detecting that the paper bail assembly is at said second retracted position; and

drive control means for controlling said driving means, said drive control means being responsive to said detection signal from said detecting means to cause said driving means to rotate said platen roller first in a normal direction over a first predetermined amount and then in a reverse direction over a second predetermined amount, wherein said rotation of said platen roller in the reversed direction causes said paper bail assembly to return to said set position through an automatic interaction with said position control means.

4,714,365

MECHANICAL PENCIL

Hidehei Kageyama, and Yukimasa Kuwabara, both of Saitama, Japan, assignors to Kabushikikaisha Kotobuki, Kyoto, Japan

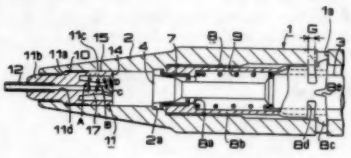
PCT No. PCT/JP86/00032, § 371 Date Mar. 14, 1986, § 102(e) Date Mar. 14, 1986, PCT Pub. No. WO86/04300, PCT Pub. Date Jul. 31, 1986

PCT Filed Jan. 25, 1986, Ser. No. 849,506

Claims priority, application Japan, Jan. 26, 1985, 60-9595; Jan. 26, 1985, 60-9596; Oct. 22, 1985, 60-161400; Dec. 28, 1985, 60-203143

Int. Cl.⁴ B43K *21/16*

U.S. Cl. 401—65 **4 Claims**



4. A lead feeding slider for a mechanical pencil comprising an axially movable slider means inserted into a fore means of said mechanical pencil, said slider means integrally provided with a resilient sliding contact member holding a lead with a first predetermined frictional resistance and a sliding member placed in sliding contact with the inner peripheral surface of the fore means in the outer peripheral surface thereof with a frictional resistance greater than the first frictional resistance.

4,714,366

LOOSE-LEAF DOCUMENT BINDER

John E. Boudrot, 216 College Farm Rd., Waltham, Mass. 02154

Filed May 15, 1986, Ser. No. 863,574

Int. Cl.⁴ B42F *3/00, 11/00;* **F16B** *21/00, 21/12*

U.S. Cl. 402—13 **19 Claims**

1. A fastener device for holding together pages of a document by securing the pages of the document together at holes that align for all pages along one margin of the document, the holes in each page being the same pre-determined diameter and positioned with respect to the page margin comprising,

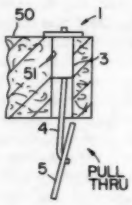
(a) a relatively rigid cylindrical member having a head at one

end, the diameter of the cylinder being less than the pre-determined diameter of the holes in the pages, and the head at one end being greater than said pre-determined diameter of the holes in the pages,

(b) an elastic member extending from the opposite end of said cylinder and

(c) a bar member that is attached at the center thereof to the extending end of said elastic member,

(d) whereby the fastener device, oriented with one end of the bar against said opposite end of the cylinder so that the bar and the cylinder are substantially aligned with the bar



extending from said opposite end of the cylinder, may be inserted, the bar end first, into one side of the document through the aligned holes in the pages of the document up to the inside of said head so that the bar emerges from the other side of the document through the aligned holes and the emerging end of the bar may be pulled through the document so that the bar fully emerges from said other side of the aligned holes, turned transverse to the elastic member, and released, whereupon the elastic member urges the bar and head together and so secures the document pages together.

4,714,367

COUPLING ASSEMBLY FOR JOINING TWO PROFILED RAILS

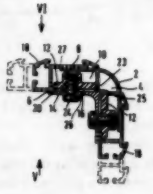
Heinz G. Baus, 35 Wartbodenstrasse, CH-3626 Hünibach-Thun, Switzerland

Division of Ser. No. 585,999, Mar. 5, 1984, Pat. No. 4,611,947. This application Jun. 20, 1986, Ser. No. 876,422

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1983, 3310005

Int. Cl.[4] F16B *7/00*; F16D *1/12*

U.S. Cl. 403—104 **9 Claims**



1. A coupling assembly comprising: a multi-walled first elongated profiled hollow rail having a longitudinal axis, an inner space running along said axis and an opening into the inner space of said rail, said opening extending essentially over the full length of said first rail and giving access to said inner space; a clamping element having a bearing surface and being constructed of a size and shape to allow passage thereof across said opening, said clamping element being formed with a threaded hole; means mounting said clamping element in said inner space for non-rotational but translational movement relative to said axis; means defining a fixed clamping surface in said inner space, said clamping surface and said bearing surface defining therebetween a clamping gap; said first profiled rail having a wall formed with a hole therethrough facing said threaded hole of said clamping member; a screw extending freely through said wall hole and screwed into said threaded hole of said clamping member, constructed so that rotation of said screw causes said translational movement of said clamping member and variation in the width of said clamping gap; and a second profiled rail having a leg inserted into said clamping gap, whereby rotation of said clamping screw in one direction produces a clamping pressure on said leg to secure said profiled rails together and rotation of said screw in reverse direction loosens said pressure and frees said profiled rails from one another so as to allow relative spatial adjustment of said rails, said second profiled rail having a longitudinal axis and said leg having a slot which extends into said leg from a free longitudinal edge of said leg substantially perpendicularly to the longitudinal axis of said second rail, and wherein said screw extends through said slot.

4,714,368

BUSH WITH A SPHERICAL SLIDING SURFACE

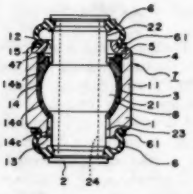
Kouji Sawada, Toyota; Kiyokatsu Miura, Gamagoori; Keiichiro Suzuki, Shizuoka; Hidetaka Idosako, and Hideo Kazusa, both of Hamamatsu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Ishikawa Tekko Kabushiki Kaisha, both of, Japan

Filed Oct. 14, 1986, Ser. No. 917,961

Claims priority, application Japan, Oct. 11, 1985, 60-154413[U]

Int. Cl.[4] F16C *11/06*

U.S. Cl. 403—132 **11 Claims**



1. A bush with a spherical sliding surface comprising:

a socket constructed of a hollow, generally cylindrical body having an axial mid-portion, first and second axial ends, and apertures at each axial end and having an inside surface which is spherically shaped from said axial mid-portion toward said first axial end and cylindrically shaped from said axial mid-portion toward said second axial end;

a ball-integral shaft having a ball portion having opposed axial ends and a shaft portions integrally connected to said opposed axial ends of the ball portion, said ball portion being located in said socket and said shaft portions extending through said apertures of said socket along a longitudinal axis;

a bearing body having a first and second axial ends disposed in the socket, said first and second axial ends corresponding to said first and second axial ends of said socket, said bearing body slidably housing said ball portion of said ball-integral shaft therein, said bearing body comprising a hollow, generally cylindrical, single body having an outside surface matching the shape of said inside surface of said socket and a spherical inside surface matching the shape of an outside surface of said ball portion of said ball-integral shaft, a contact surface between said bearing body and said ball-portion of said ball-integral shaft extending between said opposed axial ends of said ball portion of said ball-integral shaft and forming said spherical sliding surface of the bush, said bearing body including a step formed in a shoulder portion proximate said first axial end, said step comprising a first surface which is substantially perpendicular to said longitudinal axis and a second surface which is oblique to said longitudinal axis said bearing body having a plurality of slits extending in an

axial direction from said second axial end to a mid-portion of said bearing body, said bearing body being constructed of polyacetals;

a cushion for pre-loading said bearing body, said cushion being ring-shaped and having axial end portions, said cushion being located in at least one of said first and second end portions of said socket with an axial end of said cushion seated in said step of said bearing body, said cushion being constructed of a polymeric elastic material which is softer than the polyacetals of said bearing body, said cushion including axially receding recesses in at least one of said axial end portions of said cushion such that said at least one axial end portion includes said axially receding recesses and axially extending ribs spaced between said recesses, and said cushion being assembled in said socket with said axially extending ribs being compressed so as to provide a preload force on said first and second surfaces of said step; and

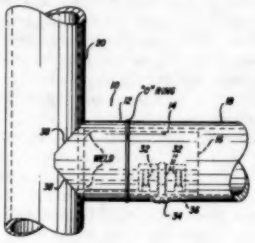
a plug for closing a periphery of one of said apertures of said socket, the plug fixed to a mouth of said socket adjacent to the aperture, and being in contact with one axial end of said cushion so as to pre-load said bearing body via said cushion.

4,714,369

RAIL CONNECTOR

Thomas Souza, Jr., 145 Hekili St., Kailua, Hi. 96734

Filed Dec. 19, 1986, Ser. No. 943,706
Int. Cl.[4] F16B *1/00*
U.S. Cl. 403—190 **17 Claims**



1. A rail connector for connecting a rail to a post or the like comprising:

an elongate circular tubular member including a reduced sleeve at one end thereof which is adapted to substantially conform to an inner surface of the rail, said sleeve having a generally longitudinal slot therein which allows said sleeve to expand and contract in order to conform to the inner surfaces of rails of varying diameters;

an adjusting means for adjusting the diameter of said sleeve by applying force to said sleeve along the edges of said longitudinal slot whereby the rail is held to said sleeve; and

a mounting means for mounting said adjusting means to the rail prior to the insertion of said sleeve into the rail with said adjusting means in alignment with said longitudinal slot.

4,714,370

COMMODITY SHELF ADAPTORS

Geng-Nong Chen, No. 56, Alley 22, Lane 157, Sec. 5 Fu An Road, Tainan City, Taiwan

Filed Nov. 6, 1986, Ser. No. 928,156
Int. Cl.[4] F16D *1/00*
U.S. Cl. 403—217 **6 Claims**

1. An improved shelf joint for use in a commodity shelf rack or stand comprising

a body of the joint;

a screw for insertion into said body, said screw including top and bottom surfaces,

a threaded portion around the periphery of said top surface,

a conical surface between said threaded portion and said bottom surface;

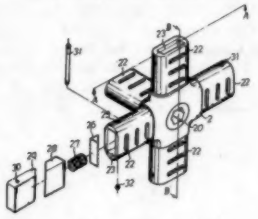
a plurality of shaft arms extending from said body incorporated onto said body and having a hollow passage through each of said shaft arms and a side opening in communication with said hollow passage;

each of said shaft arms having located therein in said hollow passage and extending in a radial direction from said screw

a thrust block having a sloping face facing toward said conical surface of said screw and in contact with said conical surface and a flat face perpendicular to said radial direction from said screw,

a buffer spring with its axis extending along said radial direction from said screw and having one end for contacting said flat face of said thrust block,

a deviation block mounted for movement along said radial direction from said screw having a flat face for contacting said buffer spring on an opposite end of said buffer



spring from the end for contacting said thrust block and having a sloping face on its opposite side from its said flat face,

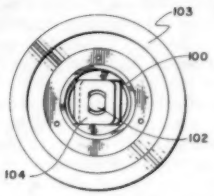
and a check block pivotally mounted in said shaft arm near one end of said check block and having a sloping face on the opposite end from where it is pivotally mounted wherein said sloping face of said check block contacts and moves along said sloping face of said deviation block to a position outside said shaft arm extending through said side opening in said shaft arm communicating with said hollow passage within said shaft arm.

4,714,371

SYSTEM FOR THE TRANSMISSION OF POWER

Arthur R. Cuse, 336 S. Occidental Blvd., Los Angeles, Calif. 90057

Filed May 20, 1986, Ser. No. 864,872
Claims priority, application Mexico, Sep. 13, 1985, 206624
Int. Cl.[4] F16B *3/00*; B25G *3/28*
U.S. Cl. 403—355 **18 Claims**



1. A coupling apparatus for rotary power transmission and axial movement between a first elongated rotary member and a second rotary member substantially concentric with the first elongated rotary member, including

a channel portion formed in an interior portion of the second rotary member and having at least one flat guide surface,

at least one drive key positioned within the channel portion of the second rotary member and including another flat guide surface complementary to the one flat guide surface to allow linear sliding movement between the drive key and the channel portion along the flat guide surfaces and

to prevent relative rotational movement between the drive key and the channel portion,

the at least one drive key additionally including an opening for receiving the first elongated rotary member, and

means for coupling the first elongated rotary member within the opening of the drive key to allow axial movement between the first elongated rotary member and the drive key and to prevent relative rotational movement between the first elongated rotary member and the drive key.

4,714,372

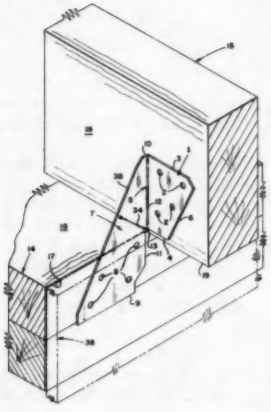
HURRICANE TIE

Alfred D. Commins, Danville, Calif., assignor to Simpson Strong-Tie Company, Inc., San Leandro, Calif.

Filed Aug. 18, 1986, Ser. No. 897,702

Int. Cl.[4] B25G *3/36*

U.S. Cl. 403—400 **3 Claims**



1. A sheet metal tie for connecting wood members in building structures comprising:

a. a unitary body member including a truncated, generally right angled triangular, base member having an area dimensioned for and pierced by a plurality of nail holes and including a generally straight base edge and a generally straight truncated edge joined by an inside edge;

b. a truncated generally right angled triangular web member having an area dimensioned for and pierced by a plurality of nail holes and including a generally straight base edge and a truncated edge joined by an inside edge and joined to said base member along said respective inside edges;

c. said triangular web member having a relatively larger area than said triangular base member and said generally triangular members being arranged in reverse apex order with respect to one another;

d. said base and web members lie in planes which are mutually angularly related to each other;

e. the juncture of said inside edge of said web member and said truncated edge of said base member is formed with a radiused curve; and

f. said truncated edge of said web member is generally in alignment with a portion of said base edge of said base member adjacent said inside edge of said base member.

4,714,373

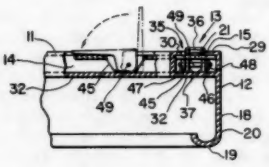
PICTURE FRAME CLAMP

Theodore R. Heekin, Bay Villiage, Ohio, assignor to Valco/Valley Tool & Die, Inc., North Royalton, Ohio

Filed Jun. 19, 1986, Ser. No. 875,922

Int. Cl.[4] F16B *12/50*

U.S. Cl. 403—402 **12 Claims**



1. A clamping device used in the construction of a metal picture frame which is formed of metal framing members that are joined in mitered relation, each of the members having an enclosed channel with a longitudinally extending slot that is bordered by a pair of flanges which are spaced in parallel relation from a channel bottom, the device comprising:

(a) an L-shaped rigid plate having a pair of outstanding legs which are at right angles to each other;

(b) a rotatable lever associated with each of the legs, the levers each having a cam and a connecting handle which a person uses to rotate the lever and

(c) means mounting the levers on the legs for rotation about an axis which is normal to the longitudinal axes of the channel and slot, the mounting means, handle and cam of each lever being disposed in relation to each other such that the cam will engage the channel bottom while remaining free of the flanges and simultaneously force the rigid plate against adjacent flanges of the framing members and cause relative movement between the framing members and legs, whereby adjacent framing members are moved into tighter mitered relation, when the handle is rotated from an unlocked position where the cam is disengaged from the channel bottom, to a locked position where the handle abuts the adjacent leg of the plate in farthest spaced relation from the other leg.

4,714,374

ROAD SURFACE LAYER REPRODUCING MACHINE

Tohru Mihara, Kyoto, Japan, assignor to Taisei Road Construction Co., Ltd., Tokyo, Japan

Filed Jul. 2, 1986, Ser. No. 882,136

Claims priority, application Japan, Apr. 16, 1986, 61-57238[U]

Int. Cl.[4] E01C *23/06*

U.S. Cl. 404—91 **4 Claims**

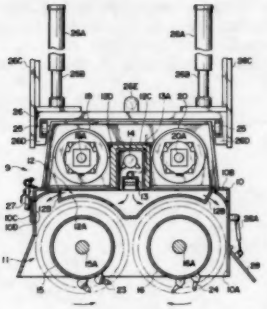
1. A rotor unit for a road surface layer reproducing machine for scarifying/mixing asphalt pavement comprising:

a support frame, said support frame including a mixing chamber in a lower section thereof, said mixing chamber having an opening at a lowermost end thereof, said support frame further including a heating room in an upper portion thereof, said heating room including heating means for heating said mixing chamber to and maintaining said mixing chamber at a temperature which is greater than the ambient temperature;

a plurality of power cylinder means operatively coupling said support frame member to a lower portion of a vehicle body of the road surface layer reproducing machine; and

a plurality of rotor means mounted to said support frame so as to be disposed in said mixing chamber such that a longitudinal axis of each said rotor means extends perpendicularly to a direction of movement of the vehicle body, the longitudinal axis of each said rotor means being disposed substantially parallel to one another such that said rotor

means are mounted in rows, each said rotor means being adapted to rotate about its respective longitudinal axis



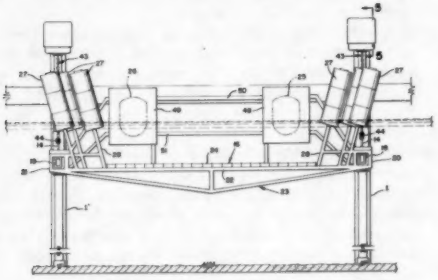
such that each rotor means rotates in a direction opposite to a next adjacent rotor means.

4,714,375

SEAPLANE AND DOCK LIFT

Ernest W. Stevenson, Danville, and Randall E. Nahas, Alamo, both of Calif., assignors to Levitator, Inc., Glenbrook, Nev.

Continuation-in-part of Ser. No. 671,007, Nov. 13, 1984, abandoned. This application Jun. 20, 1986, Ser. No. 877,013
The portion of the term of this patent subsequent to Nov. 13, 2001, has been disclaimed.
Int. Cl.[4] B63C *3/06*
U.S. Cl. 405—3 **14 Claims**



1. A watercraft lift mounted in the soil beneath a body of water comprising:

(a) A pair of laterally spaced free standing load bearing stanchion members engaging the soil beneath said body of water;

(b) a base plate connected to the top of each of said stanchions;

(c) a bracket member connected to each of said base plates laterally disposed from said stanchion members and adapted for connection to a stablizing member;

(d) a sleeve assembly slidably mounted on each of said stanchion members for travel thereon;

(e) a fork member connected to each of said sleeve assemblies and extending laterally from said stanchion members and generally parallel to each other;

(f) a platform connected to each of said fork members extending laterally between said stanchions for engaging said watercraft;

(g) a lifting member connected to said sleeve assembly; and

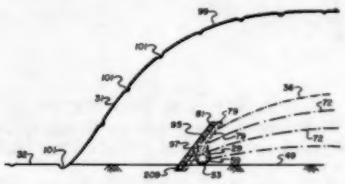
(h) mechanical multiplying means mounted on said stanchion members and connected to said lifting member for lifting substantially said entire platform above said body of water.

4,714,376

HILLSLOPE LANDSLIDE STABILITY DRAIN

S. Abdollah Jenab, 1289 North 400 East, #3, Logan, Utah 84321

Filed Dec. 31, 1984, Ser. No. 687,652
Int. Cl.[4] E02B *11/00*; **E02D** *3/10*
U.S. Cl. 405—45 **18 Claims**



1. An apparatus for draining groundwater from a water saturated zone of a hill having contour lines associated therewith, a failure surface and an impermeable substantially horizontal geological positioned below said water saturated zone, said system consisting of:

a pair of first, cylindrical elongate horizontal bore within said hill, said first bores being oriented parallel to a hill contour line and remote from a failure surface of said hill, each of said first bores having a proximal end and a distal end, each of said proximal ends being positioned laterally from a failure surface of said hill whereby said proximal end is outside of a flow path of slough material which has detached itself from said hill along said failure surface, each of said distal ends bieng positioned within said hill within said saturated zone;

a plurality of second, cylindrical elongate horizontal bores within said hill associated with each first bore, each of said second bores being oriented parallel to a hill contour line and remote from said hill failure surface, each plurality of said second bores having said second bores positioned one above another and above a respective first bore wherein each second bore overlaps an adjacent second bore whereby each second bore communicates with each adjacent second bore, one of said second bores overlapping a respective first bore;

an upright region of said hill positioned above each uppermost second bore and below an exterior surface of said hill, said upright region being retained undisturbed and in situ whereby said upright region retains its natural anchorage and cohesion action between said hill and face of said hill;

an association of said plurality of second bores defining a pair of upstanding necks one of said necks extending from each said first bore upwards, said necks being each inclined from an imaginary vertical line passing through said first bores;

a rigid, upstanding, impermeable elongate apron positioned along an upstanding wall of each said neck and extending along a length of said neck region wherein each said apron is positioned sufficiently below said upright hill region to retain said region undisturbed and in situ;

a conduit means having porous walls adapted to receive fluid from without said conduit means and convey said fluid along a predetermined path, said conduit means being positioned within each of said bores, substantially horizontally and within said hill remote from a failure surface of said hill wherein a longitudinal axis of said conduit means is substantially parallel to the contour lines of said hill;

outlet means mounted on said conduit means for continuously directing fluid from said conduit means and conveying that fluid to a location away from said hill;

wherein each of said first bores is positioned adjacent said impermeable strata and below said saturation zone and each respective said apron intersects said strata whereby said geological strata and said aprons form a pair or geo-

logical "L"-shaped cross sectioned impermeable pockets within said hill to entrap groundwater and channel said groundwater to said conduit means.

4,714,377

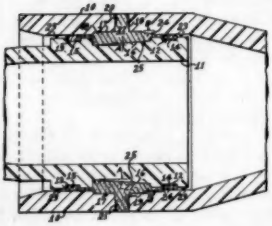
METHOD OF LAYING PIPE SECTIONS

Hartley Sandt, Orange Park, and Henry Happy, Jacksonville, both of Fla., assignors to Price Brothers Company, Dayton, Ohio, a part interest

Division of Ser. No. 698,020, Feb. 4, 1985, Pat. No. 4,647,080. This application Oct. 28, 1986, Ser. No. 923,966

Int. Cl.[4] B63B *35/04*

U.S. Cl. 405—154 20 Claims



1. A method of laying, testing, and assembling sections of pipe into an indefinite length of piping which comprises the sequential steps of:

(1) positioning an inner pipe section and an outer pipe section in general longitudinal alignment for joining by telescoping the two sections together, the two sections when joined having aligned circumferential recesses in their facing surfaces adjacent the telescoping ends, and the inner section having a pair of circumferential grooves spaced on opposite ends of the recess;

(2) placing two spaced ring sealing gaskets around the inner section respectively in the grooves;

(3) telescoping the inner section with gaskets in the grooves into the outer section to a predetermined depth;

(4) attaching two conduits to the recesses by two respective passageways through the outer section at generally vertically diametrically opposite positions;

(5) pressurizing the space between the sealing gaskets by closing one conduit and introducing a fluid under superatmospheric pressure into the other conduit to test the sealing capabilities of the gaskets in the assembled joint;

(6) covering the joined pipe sections wtih earth and allowing the sections to settle and extending the conduits from the pipe sections to above ground level;

(7) thereafter introducing a solidifiable fluid grout through the conduit attached to the lower passageway until the recess is filled with grout and substantially no air bubbles are present; and

(8) allowing the grout to solidify.

4,714,378

APPARATUS AND METHOD FOR TRENCHING SUBSEA PIPELINES

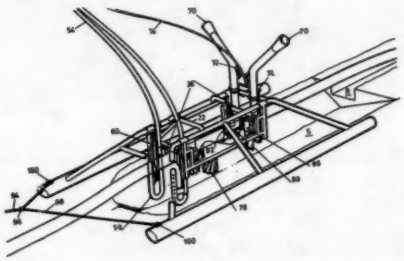
John B. Lincoln, Applecross, Australia, assignor to Ocean Engineering Systems, Pty., Ltd., Applecross, Australia

Filed May 15, 1985, Ser. No. 734,370

Claims priority, application Australia, May 22, 1984, 28500/84

Int. Cl.[4] E02F *3/88, 5/10*; F16L *1/04*

U.S. Cl. 405—163 7 Claims



1. Apparatus for trenching a prelaid subsea pipeline of indeterminate length, comprising:

a sled including a frame and two laterally spaced pipeline- and trench-straddling supports constructed and arranged to run on the seabed and to define with said frame a tunnel extending longitudinally of the sled, such tunnel being open to the front and to the rear;

roller cradle means on said frame for supporting a segment of the pipeline in an elevated condition relative to the seabed, with the pipeline upstream and downstream of that segment sloping downwards to the seabed to the front of the sled and, to the rear of the sled, into a trench formed by the apparatus;

at least one vertically adjustable jet manifold mounted on said frame near the front of said tunnel, each said jet manifold being constructed and arranged to fluidize soft seabed in a region of the seabed which is sufficiently wide for trenching the pipeline, but which is insufficiently wide as to destroy support for said laterally spaced supports of said sled;

at least one vertically adjustable eductor tube mounted on said frame near the rear of said tunnel, each said eductor tube being constructed and arranged to suck-up loosened seabed material from said seabed region and remove such material sufficiently to trench the pipeline behind said apparatus;

a set of counter-rotating, vertical axis mechanical cutters mounted to said frame intermediate said at least one jet manifold and said at least one eductor tube and being movably mounted for movement to and from a working position located beneath said elevated segment of the pipeline;

means for advancing said sled along the pipeline;

means for supplying a pressurized working fluid to said at least one jet manifold for jetting into said seabed in said region;

motor means for powering said mechanical cutters in such a sense as to cut into said seabed in said region when said cutters are disposed in said working position; and

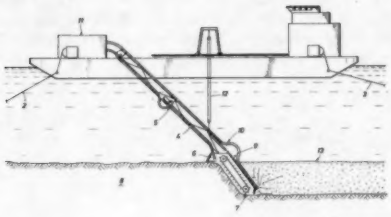
means for supplying an upwardly-moving stream of pressurized fluid in said at least one eductor tube for sucking loosened seabed material from said region to create said trench.

4,714,379

PIPELAY IN SLURRY TRENCH

Robert T. Gilchrist, Jr., Houston, Tex., assignor to Shell Western E&P Inc., Houston, Tex.

Filed Nov. 26, 1986, Ser. No. 935,423
Int. Cl.[4] F16L *1/04;* E02F *5/02*
U.S. Cl. 405—163 5 Claims



1. A method for laying a pipeline offshore in the seafloor, comprising:

excavating a deep trench in the seafloor;

filling the trench with a slurry to maintain the integrity of the seafloor trench until the pipeline can be laid thereinto;

laying the pipeline on top of the slurry; and

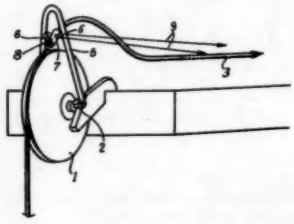
sinking the pipeline through the slurry and downwardly in the trench.

4,714,380

APPARATUS TO MANEUVER CABLES OR CONDUITS PASSING OVER A DIRECTION CHANGER

Alain Coutarel, Paris, France, assignor to Coflexip, Paris, France

Filed Apr. 11, 1986, Ser. No. 850,547
Claims priority, application France, Apr. 11, 1985, 85 05440
Int. Cl.[4] B23B *35/04;* F16L *1/00*
U.S. Cl. 405—168 11 Claims



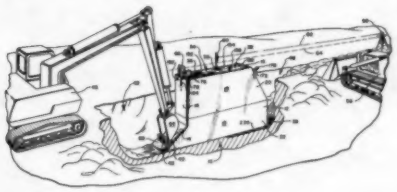
1. An apparatus for maneuvering a line such as a cable or flexible conduit having thereon at least one rigid outer accessory with a diameter greater than that of the line around a direction changing means over which the line is moved, said apparatus comprising, maneuvering means mounted adjacent said direction changing means, means for retaining the accessory on the maneuvering means, means mounting the maneuvering means for movement with respect to the direction changing means, so that said retaining means moves said accessory along a path outside a surface of the direction changing means which is engaged by the line, from a first position in which the accessory is picked up by the retaining means upstream from the direction changing means, to a second position in which the accessory is located downstream from the direction changing means and is released from said retaining means, and means for taking up the tension in the conduit during the movement of the maneuvering means between said first and second positions.

4,714,381

MACHINE FOR LAYING CONDUIT AND METHODS FOR USE THEREOF

G. Brent Hatch, Box 996, 2661 South Hwy. 23, Mendon, Utah 84325, assignor to G. Brent Hatch and Susan W. Hatch, both of Mendon, Utah

Filed May 2, 1985, Ser. No. 729,566
Int. Cl.[4] F16L *1/02*
U.S. Cl. 405—178 126 Claims



1. An apparatus for laying conduit within a trench, comprising:

a boxlike structure having end walls and side walls, said boxlike structure being separable into an upper portion and a lower portion and further comprising:

a fill bin compartment internal of said boxlike structure for receiving fill material and delivering fill material to the bottom of the trench; and

a conduit laying compartment adjacent said fill bin compartment, said conduit laying compartment permitting the conduit to be fed through said conduit laying compartment to the desired resting position at the bottom of the trench;

drawing means connected rigidly to said lower portion for grasping and advancing said boxlike structure along the bottom of the trench; said drawing means having a configuration that facilitates application of vertical, longitudinal and lateral forces on said boxlike structure thereby permitting an operator of the apparatus to maneuver said boxlike structure on grade along the bottom of the trench; and

securing means for securing the upper portion of said boxlike structure to the lower portion, said securing means being capable of disengagement enabling the upper portion to be unconnected and removed from the lower portion while the lower portion remains within the trench thereby permitting the lower portion to be pulled along the bottom of the trench once the upper portion is removed.

4,714,382

METHOD AND APPARATUS FOR THE OFFSHORE INSTALLATION OF MULTI-TON PREFABRICATED DECK PACKAGES ON PARTIALLY SUBMERGED OFFSHORE JACKET FOUNDATIONS

Jon E. Khachaturian, 3829 Birchfield Dr., Harvey, La. 70058

Filed May 14, 1985, Ser. No. 734,402
Int. Cl.[4] E02B *17/00*
U.S. Cl. 405—204 23 Claims

1. A method for the offshore installation of multi-ton prefabricated deck package on a jacket foundation, comprising the steps of:

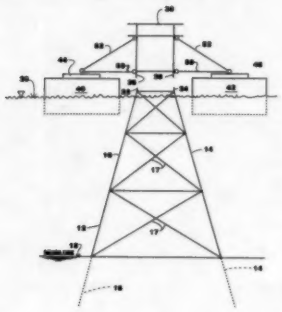
a. transporting the prefabricated deck package to the site of the jacket base on a first transport barge;

b. attaching a triangular truss-like lifting assembly to the deck package at multiple positions on the deck package that are at least on generally opposite sides of the deck package, and at upper and lower positions on the deck package respectively and at vertices of the triangular truss-like lifting assembly, the triangular truss-like lifting assembly including at least three chords, including a horizontal chord normally in tension during the lifting process

which has a variable length and a diagonally extending chord normally in compression during the lifting process;

c. structurally supporting the triangular truss-like lifting assembly with one or more lift barges;

d. removing the transport barge as a support for the deck package so that the deck is supported by the triangular truss-like lifting assembly and lift barges, with the deck



package froming a load carrying portion of the triangular truss-like lifting assembly;

e. alinging the deck package with the jacket so that the deck package can be placed on the jacket; and

f. lowering the deck package upon the jacket by changing the length of the horizontal chord of each triangular truss-like lifting assembly.

4,714,383

INSERT ROTARY CUTTER

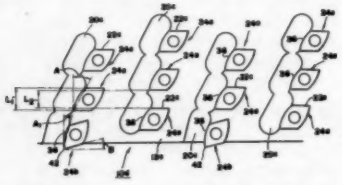
Hiroshi Shimomura, Nakano; Kazuo Iizuka, Warabi; Makoto Harano, and Akifumi Hamada, both of Takaoka, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo and Ryoco Seiki Co., Ltd., Takaoka, both of, Japan

Filed Jul. 21, 1986, Ser. No. 887,626

Claims priority, application Japan. Jul. 23, 1985, 60-112820[U]; Oct. 8, 1985, 60-154232[U]; Oct. 8, 1985, 60-154233[U]; Oct. 8, 1985, 60-154234[U]

Int. Cl.[4] B23C *5/20*

U.S. Cl. 407—42 **9 Claims**



1. An insert rotary cutter for processing a metal workpiece comprising:

a cutter body of a generally circular cross-section having an axis of rotation therethrough; and

one or more cutter inserts each comprising a generally quadrilateral plate defined by a front face, a rear face disposed generally parallel to said front face and two opposed pairs of side faces, and having a thickness between said front and rear faces smaller than a width between a respective one of said opposed pairs of side faces, said insert having a pair of main cutting edges defined by intersections of said front face with said opposed pair of side faces, each of said one opposed pair of side faces sloping inwardly in a direction away from said front face and being convexly curved along their respective lengths whereby said pair of main cutting edges are convexly curved, said insert being releasably mounted on a periphery of said body in such a manner that one of said main cutting edges is indexed in a peripheral cutting position, and that said front face is facing radially outwardly of said body so that one of said opposed pair of side faces serves as a rake surface for said indexed main cutting edge, said rake surface having a foremost and a rearmost end, said rake surface for said indexed main cutting edge being disposed so as to have a positive axial rake angle and a radial rake angle both increasing progressively from said foremost end of the rake surface toward said rearmost end thereof.

4,714,384

TOOL AND INSERT, PREFERABLY FOR TURNING

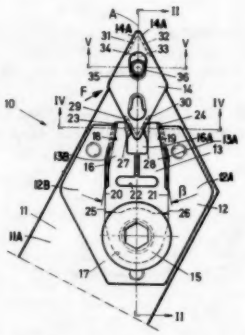
Stig E. V. Lagerberg, Sandviken, Sweden, assignor to Santrade Limited, Lucerne, Switzerland

Filed May 16, 1986, Ser. No. 863,934

Claims priority, application Sweden, May 17, 1985, 8502451

Int. Cl.[4] B23B *27/16*

U.S. Cl. 407—103 **16 Claims**



1. A tool comprising:

a shank including:

an upper surface, and

a projection upstanding from said upper surface and including first contact surface means,

an insert including:

a lower surface for engaging said upper surface,

cutting edge means at a front edn of said insert,

a hole for receiving said projection and including second contact surface means arranged to engage said first contact surface means on opposite sides of an imaginary front-to-rear reference line extending through said insert, and

third contact surface means disposed adjacent a rear end of said insert,

a unit disposed to the rear of said insert and movable forwardly and rearwardly, said unit including fourth contact surface means arranged to contact said third contact surface means on opposite sides of said reference line,

said first and fourth contact surface means oriented to force said lower surface downwardly against said upper surface in response to said insert being urged forwardly by said unit, and

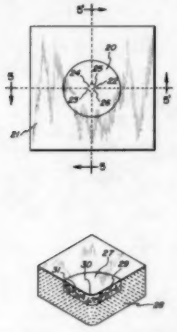
means for urging said unit forwardly.

4,714,385

POLYCRYSTALLINE DIAMOND AND CBN CUTTING TOOLS

Ranga Komanduri, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 27, 1986, Ser. No. 833,928
Int. Cl.[4] B23P *15/28*
U.S. Cl. 407—119 5 Claims



1. A process for producing a composite of a circular polycrystalline diamond layer adhered in the recess of a cemented carbide substrate structure which comprises forming a cemented carbide substrate structure comprised of a substrate with a disk-shaped recess wherein said recess is substantially centrally disposed in a face of said substrate with an element of cemented carbide substantially centrally disposed within said recess, said element having four curved sides with each said curved side being in the shape of a tool nose of predetermined radius, said cemented carbide being comprised of polycrystalline metal carbide containing a metallic cementing agent, filling said recess with crystals of diamond, heating the resulting assembly under an applied pressure to a temperature above the melting point of said metallic cementing agent but below a temperature which has any significant deleterious effect on said assembly for a period of time sufficient to form said composite and recovering said composite, the thickness of said polycrystalline diamond layer being substantially equivalent to the depth of said recess, the height of said element being substantially equivalent to the thickness of said diamond layer.

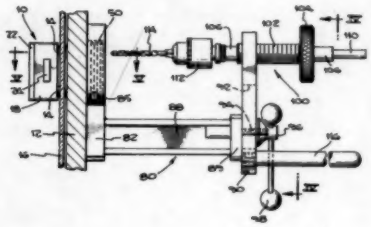
5. A composite useful for slicing into a plurality of cutting tools comprised of a disk-shaped polycrystalline diamond or cubic boron nitride layer integrally adhered to a substrate structure, said substrate structure being comprised of a substrate having a disk-shaped recess, a face of said layer being adhered to the bottom surface of said recess, the peripheral portion of said layer being adhered to the wall of said recess, the thickness of said polycrystalline layer being substantially equivalent to the depth of said recess, an integral element of said substrate structure being substantially centrally disposed within said recess passing cross-sectionally through said polycrystalline layer, the height of said element being substantially equivalent to the thickness of said polycrystalline layer, said element being in the shape of four tool noses of predetermined radii in contact with said polycrystalline layer, the mass of said substrate structure being significantly larger than the mass of said layer, said substrate structure being comprised of polycrystalline metal carbide containing a metallic cementing agent.

4,714,386

LOCKSMITHS' METHOD AND APPARATUS FOR COMBINATION SAFES

Peter J. Phillips, Redundo Beach, Calif., assignor to Lockmasters, Inc., Nicholasville, Ky.

Division of Ser. No. 832,169, Feb. 20, 1986, Pat. No. 4,662,201.
This application Jan. 20, 1987, Ser. No. 4,155
Int. Cl.[4] B23B *47/28;* E05B *63/00*
U.S. Cl. 408—72 R 8 Claims



1. An apparatus for locating and drilling an access hole through the door of a safe and into a combination lock mounted on the inside thereof within the area of the lock's dial ring at a given position relative to the spindle of the lock using a drill motor and bit, comprising:

an annular-shaped drill fixture made of a hard material, said fixture having generally planar, parallel front and rear surfaces, an inner diameter sized to pass said spindle coaxially therethrough, an outer diameter the same as, or greater than, the diameter of said dial ring, and at least one drill guide hole therethrough normal to said front and rear surfaces, said guide hole having substantially the same diameter as said access hole and located in said fixture at a radial position equal to the radial position of said access hole relative to said spindle;

means for mounting said fixture to said door coaxially with said spindle at an angular position on said door such that said drill guide hole is positioned coaxially over said access hole position; and

derrick means for mounting said drill motor and bit to said drill fixture such that the axis of said bit is positioned generally orthogonal to said door, including means for adjustably-positioning said bit coaxially with said drill guide hole and for clamping said bit in said position, further including means for advancing said bit into said drill guide hole, through said door, and into said lock.

4,714,387

GEAR CUTTING PROCESS

Seishichi Ohno, Kawaguchi, Japan, assignor to Nissho Seiko Kabushiki Kaisha, Japan

Filed Nov. 8, 1985, Ser. No. 796,520
Claims priority, application Japan, Nov. 13, 1984, 59-237645
Int. Cl.[4] B23F *23/10*
U.S. Cl. 409—51 3 Claims

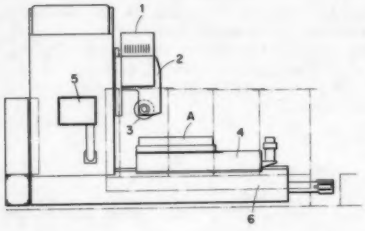
1. A gear cutting method for cutting a work with a milling cutter of a gear cutting machine having a cutting blade formed in a shape similar to an involute curve, said gear cutting machine including a main body having a bed on which a table is rotatably mounted, comprising the steps of:

setting the work on the table intermittently rotating on the bed of said main body of said gear cutting machine;

measuring and obtaining a heat expansion amount of said work in advance;

compensating the feeding amount and the processing pitch of said milling cutter according to the expanded dimen-

sion of said work at the time when said work is expanded by cutting heat; and



cutting said work from a lower part to an upper part thereof by said milling cutter.

4,714,388

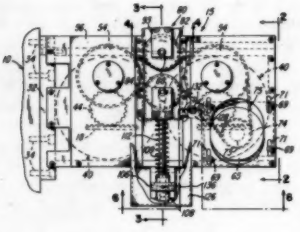
DUAL PINION ANTI-BACKLASH CARRIAGE DRIVE FOR A MACHINE TOOL

G. Daniel Siler, Dayton, Ohio, assignor to Dayton Machine Tool Company, Dayton, Ohio

Filed Oct. 14, 1986, Ser. No. 918,296

Int. Cl.[4] B23Q *23/00*

U.S. Cl. 409—146 **13 Claims**



1. Apparatus adapted for moving a carriage or slide along guide ways of a machine tool having an elongated rack, said apparatus comprising a frame, a set of gearboxes supported by said frame and having corresponding input and output shafts, a set of pinions connected to said output shafts and positioned to engage the rack at longitudinally spaced locations, a reversible motor supported by said frame and having a motor shaft, a set of pulleys connected to said motor shaft and to said input shafts of said gearboxes, an endless flexible elongated belt having longitudinally spaced teeth and connecting said pulleys to provide for driving said pinions through said gearboxes in response to rotation of said motor shaft, a set of belt tension wheels engaging said belt, means supporting said belt tension wheels for movement as a unit relative to said frame, and means for biasing said belt tension wheels in a manner to produce a selected tension in said belt and a corresponding torque on each of said input shafts of said gearboxes for preloading said pinions against the rack.

4,714,389

TOOL HOLDER

Frank Johne, Lohne, Fed. Rep. of Germany, assignor to J. Kuhn GmbH Co., Dorsten, Fed. Rep. of Germany

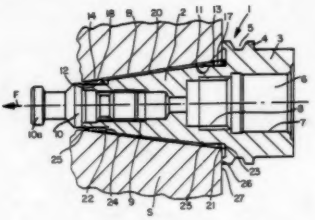
PCT No. PCT/DE86/00036, § 371 Date Oct. 14, 1986, § 102(e) Date Oct. 14, 1986, PCT Pub. No. WO86/04842, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 5, 1986, Ser. No. 924,846

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504905

Int. Cl.[4] B23C *5/26*

U.S. Cl. 409—233 **9 Claims**



1. In a tool holder having a shank portion insertable into a conical receiving part of a main spindle of a machine tool for clamping therein, a flange portion forming a front extension of the shank portion, a face on the front portion for bearing against the front face of the main spindle, a cylindrical guide on the front region of the shank portion, a tapered ring on the front portion of the shank portion engageable with the surface of the conical receiving part of the main spindle, and an elastic bearing between the flange portion and the tapered ring, the improvement comprising:

a rear region on the shank portion within the conical receiving part of the main spindle;

a second cylindrical guide on said rear region of the shank portion for engagement with the surface of the conical receiving part of the main spindle at a position spaced from the first-mentioned tapered ring; and

a second elastic bearing between said shank portion and said second tapered ring.

4,714,390

BORING TOOL

Otto Eckle, Loechgau, and Walter Roser, Besigheim, both of Fed. Rep. of Germany, assignors to Komet Stahlhalter und Werkzeugfabrik Robert Breuning GmbH, Besigheim, Fed. Rep. of Germany

Filed Jul. 14, 1986, Ser. No. 885,068

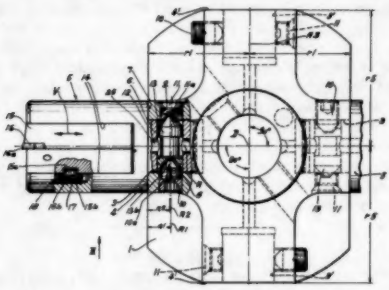
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 8520724[U]

Int. Cl.[4] B23B *29/26*

U.S. Cl. 409—234 **2 Claims**

1. In a boring tool, comprising a mounting body which can be connected to a machine tool spindle having an axis of rotation and which has a respective radially extending mounting for the shank of a respective tool head at each of two locations which are diametrically oppositely disposed with respect to its axis of rotation, and which has an abutment surface which fixes the respective tool head in the radial direction with respect to said mounting body, further comprising a cutting bit carrier which has a cutting bit and which is radially displaceable on each tool head with respect to said axis of rotation, and further comprising a clamping means with which the tool head can be connected to said mounting body, wherein the improvement comprises said mounting body, which is of a hub-like configuration, being provided at locations which are diametrically oppositely disposed with respect to said axis of rotation with a respective first mounting bore with having an axis extending radially with respect to said axis of rotation, said first mounting

bores being each surrounded by a first abutment surface extending perpendicularly to said axis of said mounting bores, wherein said tool head is provided with a fitting spigot which fits into each of said first mounting bores and which is concentrically surrounded by an annular surface extending perpendicularly with respect to an axis of said fitting spigot, said mounting body having two further, diametrically oppositely disposed, radial second mounting bores whose axes are arranged in displaced relationship through 90° in the direction of rotation of said mounting body with respect to said axes of said first mounting bores, wherein second abutment surfaces of said second mounting bores are at a different spacing from said axis of rotation than said first abutment surfaces of said first mounting bores and wherein the spacings of said first and second abutment surfaces of said first and second mounting bores differ by an amount which is somewhat smaller than the maximum radial adjustment travel of the cutting bit carrier on said tool head.



4,714,391

EXPANSION ANCHOR ASSEMBLY

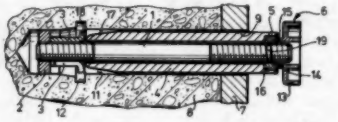
Arndt Bergner, Munich, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft

Filed Jul. 21, 1986, Ser. No. 887,324

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1985, 3526094

Int. Cl.[4] F16B *13/06*

U.S. Cl. 411—54 **5 Claims**



1. Expansion anchor assembly for use in an axially elongated borehole extending inwardly from the surface of a receiving material with an annular undercut in the borehole spaced inwardly from the receiving material surface, comprising an axially elongated threaded anchorr stud having a leading end and a trailing end with the leading end arranged to be inserted first into the borehole, a head part secured on said anchor stud at the leading end thereof with said head part extending radially outwardly from said anchor stud, locking elements extending in the axial direction of said anchor stud and extending from said head part toward the trailing end of said stud, a conically shaped member encircling said anchor stud and in contact with the ends of said locking elements spaced from said head part and being displaceable in the axial direction of said anchor stud toward the leading end thereof relative to said locking elements for radially outwardly displacing said locking elements into the annular undercut, and annular abutment member in threaded engagement with said anchor stud and arranged adjacent said conically shaped member for axially displacing said conically shaped member toward the leading end of said anchor stud, wherein the improvement comprises that said annular abutment member has an axially extending outer surface located within the axial projection of the radially outer surface of said conically shaped member, and said abutment member has a surface extending transversely of the axial direction of said anchor stud and facing away from the leading end of said anchor stud, the end of said abutment member closer to the leading end of said anchor stud and means in said surface of said abutment member for engaging a tool for threading said abutment member on said anchor stud bears against said conically shaped member, said conically shaped member is axially elongated and has end surface facing away from the leading end of said anchor bolt, an axially extending recess formed in the end surface of said conically shaped member, the diameter of said recess corresponds to at least the maximum diameter of said abutment member.

4,714,392

SELF-LOCKING SHEET-METAL NUT

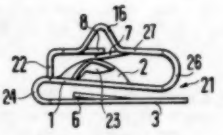
Klaus Muller, Weil-Haltingen; Bernd Mutz, Schopfheim, and Helmo Daler, Lorrach, all of Fed. Rep. of Germany, assignors to A. Raymond, Lorrach, Fed. Rep. of Germany

Filed Oct. 10, 1986, Ser. No. 917,484

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1985, 3536473

Int. Cl.[4] F16B *37/02, 37/04*

U.S. Cl. 411—175 **7 Claims**



1. A self-locking, sheet-metal nut comprising a generally flat thread leg having an embossed thread portion with an aperture therein for receipt of a threaded member and a pair of locking tabs resiliently and integrally connected to one end of said leg that extend over and are spaced from the aperture, said tabs being approximately perpendicular to the axis of the threaded member and having clamping edges which are directed toward each other from opposite sides of the aperture and that form an opening downstream of the aperture smaller than the core diameter of the threaded member to be threaded into the nut, wherein the tab having a clamping edge on the side of the opening opposite from said one end of said leg is connected to a pair of webs that extend past the opening and on either side of the tab nearest said end with each web being connected to said leg by an outer U-shaped connecting bend, and wherein the tab nearest said one end is connected to said leg by an inner U-shaped connecting bend, whereby upon turning of said threaded member through said aperture the clamping edges are forced apart and resiliently grip the core of the member to lock it in place.

4,714,393

PANEL LAYING MACHINE

Kenneth H. Betts, Mississauga, Canada, assignor to Construction Specialties Limited, Mississauga, Canada

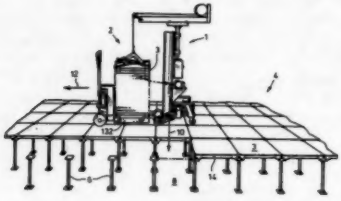
Filed Jan. 8, 1985, Ser. No. 689,682

Int. Cl.[4] E01C *11/23*

U.S. Cl. 414—10 **26 Claims**

22. A panel laying machine, comprising: a chassis; support wheels rotatably mounted to the chassis; a mast extending upwardly from the chassis; a jib mounted on the mast for turning about a vertical axis relative to the chassis; panel grip-

per means including a plurality of gripping elements engageable with a panel to selectively grip or release a panel; a flexible elongate support element suspending the gripper means from the jib; drive means carried by the jib for displacing the support element to raise and lower the gripper means, the gripper means including operating means manually actuable by an operator to cause the gripping elements to selectively grip or release a panel; load sensor means for sensing the load carried by the support element and coupled to said gripper operating means so as to maintain the gripping elements in engagement



with a panel and prevent release thereof while the load sensor means senses that the load carried by the support element exceeds a predetermined value; an electric drive motor for driving the machine and connected to at least one support wheel by a transmission; an electrically driven compressor, for providing a source of compressed air, wherein the gripper operating means and the support element drive means are both driven by compressed air; and inter-lock means in the electrical supplies to the electric drive motor and to the compressor, which inter-lock means ensures that electrical power is only ever supplied to one of the motor and the compressor.

4,714,394

METHOD AND APPARTUS FOR DEPOSITING A PROPER NUMBER OF FLEXIBLE WORK PIECES IN A PROPER POSITION

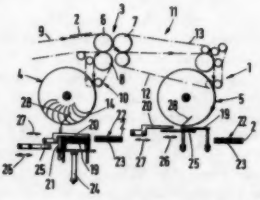
Guenter Ehlscheid, and Gilbert Hauschild, both of Neuwied, Fed. Rep. of Germany, assignors to Winkler & Duennebier Maschinenfabrik und Eisengieserei GmbH & Co. KG, Neuwied, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 719,709, Apr. 4, 1985, abandoned. This application Feb. 24, 1986, Ser. No. 834,111

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1984, 3413952

Int. Cl.[4] **B65G** *57/04*

U.S. Cl. 414—41 **6 Claims**



1. An apparatus for stacking a predetermined number of flexible work pieces coming in a first number of columns from a production machine, in determined positions to form stacks of said work pieces to be supplied to a packaging machine, comprising first conveyor means (**9**) for transporting said columns of work pieces, a branching station (**3**) for each of said columns located at a downstream end of said first conveyor means for guiding sequentially arriving work pieces to move alternately into two different directions, two depositors (**4, 5**) for each branching station located to alternately receive work pieces from said branching station, each of said depositors comprising a plurality of compartments for temporarily holding work pieces received from said branching station, two stacking tables (**19**) for each pair of depositors positioned so that one stacking table cooperates with one depositor (**4**) of a pair and the other stacking table (**19**) cooperates with the other depositor (**5**) of the same pair, a separate compression member (**20**) provided for each stacking table for pressing work pieces down on the respective stacking table, a separate stack pushing mechanism arranged for each stacking table to horizontally push a stack off the respective stacking table, second conveyor means (**23**) including two conveyors, one of which is located to receive work piece stacks from one stacking table while the other conveyor is located to receive work piece stacks from the other stacking table as the work piece stacks are pushed off said stacking tables for collecting stacks of work pieces on said second conveyor means from a plurality of said stacking tables, third conveyor means (**30,31**) for receiving stacks of work pieces from said second conveyor means, and transfer means (**35**) for transferring work piece stacks from sadi second conveyor means to said third conveyor means, whereby said several columns of work pieces are consolidated into a second number of rows of work piece stacks, said second number being smaller than said first number.

4,714,395

LIFTING PLATFORM FOR PANELS AND METHOD OF OPERATION THEREOF

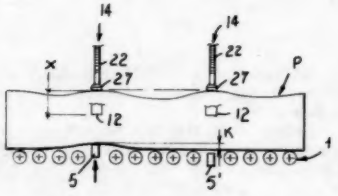
Gino Benuzzi, deceased, late of Bologna, and by Piergiorgio Benuzzi, heir-at-law, 5, Via Angelo Custode, Bologna, both of Italy

Filed Jan. 7, 1986, Ser. No. 816,763

Claims priority, application Italy, Jan. 8, 1985, 12403 A/85

Int. Cl.[4] **B65H** *1/14, 5/10*

U.S. Cl. 414—114 **6 Claims**



3. A lifting platform for feeding packs of panels to a machining line, said platform cooperating with a carriage provided with a plurality of co-planar pushes which are actuated to skim horizontally over the top of a stack of panels built up on a loading table of said platform, to transfer a pack of predetermined height (X) onto an adjoining horizontal working table, comprising:

(a) a plurality of lifters having a localized action, arranged within recesses formed in the loading table, said lifters being vertically movable between a lowered rest position below the supporting surface defined by the top surface of the loading table and a lifted position above the said supporting surface, said lifters being arranged in the same vertical planes as said pushers and being liftable individually and selectively by controlled amounts by lifting units;

(b) a plurality of dimension feelers supported by a stationary structure above the lifting platform for contacting the top surface of said stack of panels, said dimension feelers being arranged vertically in line with each of said lifters, said dimension feelers being vertically movable between an upper inoperative position and a lower working position in which the said feelers reach the same horizontal level of the co-planar pushers;

(c) computer-controlled actuation means operating in response to the vertical movement of the dimension feelers, following upward movement of the loading table to bring a pack of predétermined height (X) with its lowermost

panel in alignment with the surface of the working table, said actuation means selectively effecting the actuation of the lifting units for the lifting of the lifters.

4,714,396

PROCESS FOR CONTROLLING THE CHARGING OF A SHAFT FURNACE

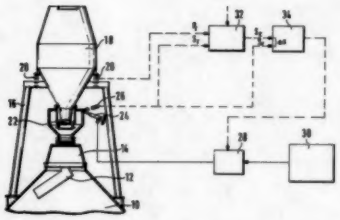
Gilbert Bernard, 6 rue Robert Schuman, Hemidange; Emile Breden, 29 rue du Village, God brange, and Emile Lonardi, 30 rue de Schouweiler, Bascgarage, all of Luxembourg

Filed May 12, 1986, Ser. No. 862,083

Claims priority, application Luxembourg, May 10, 1985, 85892

Int. Cl.⁴ B65G *25/00*

U.S. Cl. 414—161 **7 Claims**



1. A process for controlling the charging of a shaft furnace of the type having a rotary or oscillating distribution spout for distributing charge material over the charging surface of the furnace, wherein the furnace includes one or more hoppers for the storage of charge material above the furnace, each hopper being provided with a dosing valve for regulating the flow of charging material from the hopper to the spout, the furnace further including a weighing system for determining the contents of the hoppers, the weighing system determining the extent to which the valve must be initially open for the contents of the hopper to flow out within a given period, and memorizes, for different types of material and different charging conditions, the theoretical curves of a given constant out flow and the corresponding position of the dosing valve required to ensure the outflow within the given period, these curves indicating at each moment the reference flow Q_c and the position of the dosing valve including the steps of:

determining the real flow Q_r of charge material at given intervals by measuring the reduction of weight ΔP in the contents of the hopper per unit time Δt;

comparing the real flow Q_r with the reference flow Q_c;

opening the dosing valve whenever the real flow Q_r is above the reference flow Q_c.

4,714,397

AUTOMATIC PARTS FEEDER

Kuniaki Ohkuma; Reiji Nakagawa; Hisao Miyao, all of Saitama; Shinichi Yoshimura; Toshio Suzuki, both of Tokyo; Toyoaki Hayashi, Saitama; Masayasu Arakawa, Saitama, and Hideharu Koizumi, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 22, 1985, Ser. No. 801,006

Claims priority, application Japan, Nov. 22, 1984, 59-247221; Nov. 22, 1984, 59-247222; Nov. 22, 1984, 59-247223; Nov. 22, 1984, 59-247224

Int. Cl.⁴ B65H *1/00*

U.S. Cl. 414—222 **14 Claims**

1. An automatic parts feeder comprising:

a bed;

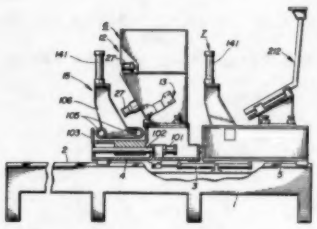
a base means movable on said bed in a first direction;

a hopper assembly mounted on said base means for containing parts;

delivery means for successively delivering the parts from said hopper assembly to a transfer means;

said transfer means transferring the parts received from said delivery means to a supply means;

said supply means supplying the parts received from said transfer means to a processing device in a second direction substantially normal to said first direction; and



said supply means comprising a movable assembly movable relative to said base means in both said first and second directions, a swing arm pivotally supported on said movable assembly and angularly movable between a substantially vertical upstanding position and an inclined position, and parts receiver means detachably mounted on said swing arm for receiving, holding, and releasing the parts.

4,714,398

DRIVE ARRANGEMENT FOR A COMBINE HARVESTER UNLOADING AUGER

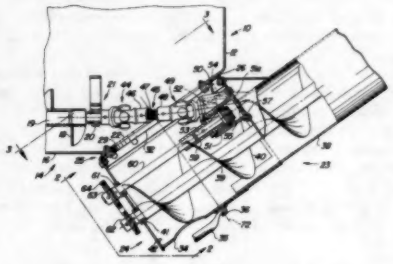
Helmut Rohwedder, Zweibrucken, Fed. Rep. of Germany, assignor to Deere & Company, Moline, Ill.

Filed Nov. 27, 1985, Ser. No. 802,657

Claims priority, application European Pat. Off., Dec. 7, 1984, 84114894.3

Int. Cl.⁴ B65G *67/24*

U.S. Cl. 414—503 **20 Claims**



1. An unloading arrangement for the grain tank of a combine harvester including a delivery auger within the tank having a delivery end for delivering grain to an aperture in a wall of the tank, and an external unloading conveyor outwardly and upwardly extending when in unloading operation and having an unloading auger within a housing, said housing including a boot portion having an inlet in a grain-receiving relationship with the tank wall aperture and means for pivotably supporting the unloading conveyor for swinging about a pivot axis, said pivot axis passing through said inlet, the delivery auger being drivably connected to the unloading auger by drive means including first and second intermediate shafts, and a bevel gear box characterized in that:

the first intermediate shaft comprises a telescoping shaft assembly having a universal joint at each end, one of said joints being connected to the delivery auger delivery end and in that the second intermediate shaft and the gear box

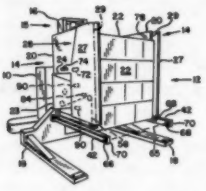
are carried by the boot portion substantially laterally offset from the unloading conveyor pivot axis, the gear box including an input connected to the other of said universal joints and an output connected to the second intermediate shaft, and in that the distance between the delivery auger end and the gear box varies as the unloading conveyor swings.

4,714,399

AUTOMATICALLY-GUIDED VEHICLE HAVING LOAD CLAMP

John E. Olson, Portland, Oreg., assignor to Cascade Corporation, Portland, Oreg.

Filed May 2, 1986, Ser. No. 859,063
Int. Cl.[4] B66F *9/00, 9/06*
U.S. Cl. 414—621 **23 Claims**



1. In a driverless vehicle for handling a load having a rearwardly-facing surface proximate said vehicle and a forwardly-facing surface remote from said vehicle, said vehicle including drive means for selectively moving at least a portion of said vehicle in a load-engaging direction or stopping said portion of said vehicle, a load clamp comprising:

(a) a pair of transversely openable and closeable arms extending forwardly from said portion of said vehicle in said direction and mounted on said portion of said vehicle so as to move in unison therewith in said direction;

(b) said arms including respective clamp pad means for selectively releasably engaging said load, said clamp pad means having a forward extremity;

(c) forward sensor means for sensing said rearwardly-facing surface of said load as said portion of said vehicle approaches said rearwardly-facing surface along said direction; and

(d) control means responsive to said forward sensor means for causing said drive means to move said portion of said vehicle forwardly in said direction a predetermined distance after said forward sensor means senses said rearwardly-facing surface of said load and to stop the forward movement of said portion of said vehicle independently of any sensing of any forwardly-facing surface of said load before said forward extremity of said clamp pad means extends forwardly of said forwardly-facing surface of said load.

4,714,400

PLURAL ROBOTIC DRIVE

Joseph A. Barnett, Endicott; Joseph M. Gomez; William F. Green, both of Vestal; Vincent M. Lisica, and Arnold B. Rosenthal, both of Vestal, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Apr. 14, 1986, Ser. No. 851,509
Int. Cl.[4] B25J *9/02*
U.S. Cl. 414—751 **18 Claims**

1. A robotic system comprising:

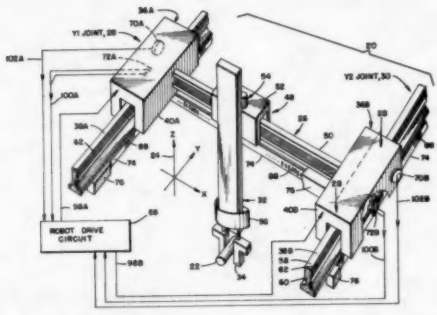
a beam for the support of a load, said beam having first and second ends;

a first rail and a second rail spaced apart from said first rail, said first rail supporting said first end of said beam, said second rail supporting said second end of said beam;

a first robotic joint means riding on said first rail for moving said first end of said beam along said first rail; a second robotic joint means riding on said second rail for moving said second end of said beam along said second rail;

a first sensing means for sensing a position of said first end of said beam;

a second sensing means for sensing a position of said second end of said beam, said first joint means including first circuit means responsive to a position signal of said first sensing means for applying power to said first joint means to move said first beam end to a first desired position, said second joint means including second circuit means responsive to a position signal of said second sensing means for applying power to said second joint means to move said second beam end to a second desired position in registration with said first desired position; and



cross-coupling circuitry connected between said first and said second circuit means, and connecting with said first and said second sensing means, for varying an amount of power applied to said first joint means relative to said second joint means to equalize positions between said first and said second ends of said beam; and wherein

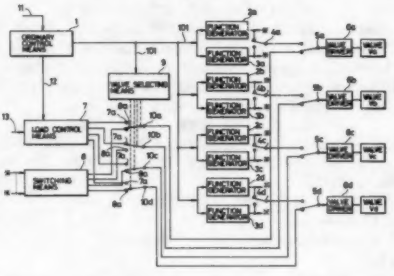
said cross-coupling circuitry is responsive to a difference between velocities of said first and said second joint means, said first and said second circuit means obtaining said velocities as a rate of change in position sensed by said first sensing means and a rate of change in position sensed by said second sensing means.

4,714,401

GOVERNING MODE CHANGE-OVER APPARATUS

Hiraku Ikeda, and Hidesumi Kuwashima, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 28, 1985, Ser. No. 792,196
Claims priority, application Japan, Oct. 31, 1984, 59-227754
Int. Cl.[4] F01D *17/04*
U.S. Cl. 415—30 **4 Claims**



1. A governing mode change-over apparatus of a steam

turbine with a plurality of steam control valves for controlling steam supply to respective nozzles annularly arranged in the turbine, the apparatus comprising:

a control means for controlling the turbine to operate at a set load and generating a steam control valve opening demand signal;

first function generator means for said steam control valves for converting said steam control valve opening demand signal into a signal for opening said control valves in a throttle governing mode;

second function generator means for said steam control valve for converting said steam control valve opening demand signal into a signal for opening said control valves in a nozzle governing mode;

driving means for driving said steam control valves to control the opening thereof according to said signal from one of said first and second function generator means;

switching means for switching said first and second function generator means from one another and electrically connecting one of said first and second functioning generator means to said driving means;

load control means for comparing actual load with the set load and generating an electrical signal, for controlling the degree of opening of said control valve so as to nullify difference between the actual load and the set load;

steam control valve opening switching means, electrically connected to both said first and second function generator means, for generating valve opening signals for governing mode switching; and

valve selecting means, electrically connected to said control means, for selecting at least one of said steam control valves in accordance with steam control valve opening signals from said control means so as to subject said selected valve to load control in accordance with signals from said load control means during the switching of the governing modes, and the other valves to opening degree switching operation for change over of the governing mode according to signals from said steam control valve opening switching means.

4,714,402

MECHANISM FOR ACTUATING DEFLECTOR OF PELTON WHEEL

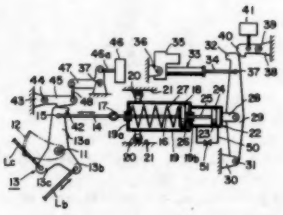
Kentaro Ichikawa, Chigasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 17, 1986, Ser. No. 908,308

Claims priority, application Japan, Sep. 18, 1985, 60-206056

Int. Cl.[4] F04D *15/02*

U.S. Cl. 415—35 **8 Claims**



1. A mechanism for actuating a deflector of a Pelton wheel comprising a deflector arm for rotating the deflector, an operating rod whose one end is pin connected to said deflector arm and whose other end carries a spring bearing plate, a cylinder in which said spring bearing plate is enclosed, and which is guided for movement in the axial direction of said operating rod, spring means which is disposed in the bore of said cylinder on the side of said operating rod and whose stored energy pulls said operating rod, a swinging lever whose one end is pivotally supported and whose midpoint is connected to one end of said cylinder, an electric servomotor connected to the free end of said swinging lever so as to cause reciprocable angular movement of said swinging lever, a first engaging means engageable with said free end of said swinging lever, thereby maintaining said swinging lever stationary, and a second engaging means for maintaining said deflector arm in the fully opened position.

4,714,403

DOWN-HOLE DEVICES FOR IMPARTING ROTARY MOTION

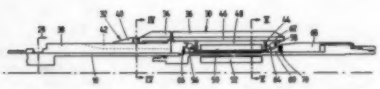
Michael K. Russell, Prestbury, and Colin Arlott, Bredon, both of England, assignors to NL Industries, Inc., New York, N.Y.

Filed Sep. 24, 1985, Ser. No. 779,740

Claims priority, application United Kingdom, Oct. 4, 1984, 8425109

Int. Cl.[4] E21B *4/02*

U.S. Cl. 415—107 **11 Claims**



1. A down-hole device for converting the kinetic energy of the mud flow passing along a drill string into rotary motion for driving a generator or a measuring or signalling instrument, the device comprising a rotary drive member arranged to have its rotational axis disposed along the axis of the drill string, an annular bladed impeller coaxial with the drive member to which it is operatively coupled to impart driving torque thereto and having a plurality of radially outwardly projecting blades distributed about the circumference thereof and arranged to be driven by the mud flow, an annular impeller bearing, and an annular bladed stator coaxial with the drive member and having a plurality of radially outwardly projecting blades distributed about the circumference thereof and arranged immediately upstream of the impeller so as to act on the mud flow before it reaches the impeller, the blades of the stator being canted relative to the mud flow and relative to the blades of the impeller to cause the mud flow to impact on the blades of the impeller at such an angle that a small or negligible thrust results at the impeller bearing due to the combined effect of the mud flow acting on all the blades of the impeller.

4,714,404

APPARATUS FOR CONTROLLING RADIAL CLEARANCE BETWEEN A ROTOR AND A STATOR OF A TUBROJET ENGINE COMPRESSOR

Alain M. J. Lardellier, Melun, France, assignor to Societe Nationale d'Etudes et de Construction de Moteurs O'Aviation (S.N.E.C.M.A.), France

Filed Dec. 17, 1986, Ser. No. 942,987

Claims priority, application France, Dec. 18, 1985, 85 18749

Int. Cl.[4] F01D *11/08*

U.S. Cl. 415—127 **12 Claims**

1. Apparatus for controlling the radial clearance between a rotor and a stator of a high-pressure compressor in a turbojet engine having a longitudinal axis and an outer casing surrounding the compressor, comprising:

(a) a plurality of circumferential segments having upstream and downstream edges arranged so as to form an inner casing located between the outer casing and the rotor so as to define a radial clearance with the rotor, each of the segments having a plurality of stator vanes mounted thereon;

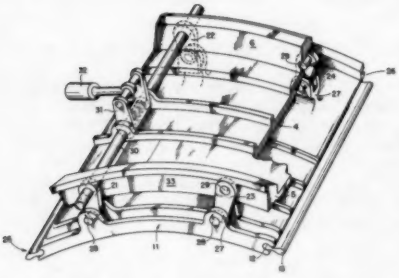
(b) a control shaft rotatably attached to the outer casing and extending generally parallel to the longitudinal axis;

(c) upstream and downstream link means connecting each of the segments with the outer casing, each link means comprising:

(i) a first link member having a first end attached to the

control shaft so as to rotate therewith and a second end pivotally attached to the segment; and,

(ii) a second link member pivotally attached to the outer casing and to the segment such that the second link member extends generally parallel to the first link member so as to form a parallelogram with the outer casing and the segment; and,



(d) control means connected to the control shaft so as to rotate the control shaft thereby moving the associated segment in a substantially radial direction so as to vary the clearance between the segment and the rotor.

4,714,405

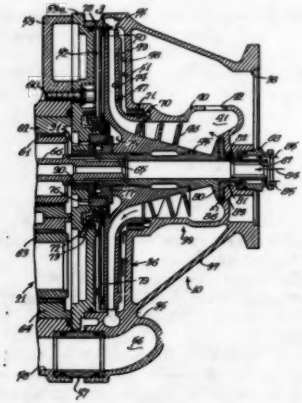
CENTRIFUGAL PUMP

John G. Schaefer; Jerome K. Aarestad, and Terry L. Whitesel, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Continuation of Ser. No. 502,104, Jun. 8, 1983, abandoned. This application Sep. 11, 1986, Ser. No. 906,676

Int. Cl.[4] F01D *25/32*

U.S. Cl. 415—169 R **2 Claims**



1. In a closed loop aircraft engine fuel system, a centrifugal pump having a casing, an impeller stage and an inducer section; a hollow impeller shaft rotatably mounted in said casing and having a spiral-bladed inducer located in a fluid chamber of the inducer section; and an impeller with front and rear shrouds located in an impeller cavity of the casing and spaced from the adjacent walls of the impeller cavity; a front end of the impeller shaft having a planar thrust bearing positioned in said fluid chamber; a journal bearing mounted in said casing and having a tubular section for rotatably mounting said front end of the impeller shaft and a planar section for coaction with said planar thrust bearing; said tubular and planar sections of the journal bearing being lubricated by fuel flowing toward said hollow impeller shaft; front and rear labyrinth seals associated one with each of said impeller front and rear shrouds and the casing and located near the inner ends of the shrouds and at different distances from the axis of rotation of the impeller shaft, said front labyrinth seal surrounding and opening to the downstream end of the spiral-bladed inducer to have fuel leakage therethrough return to the fuel being supplied to the impeller at a location circumferentially outward of the inducer and where the supplied fuel is at an elevated pressure; said casing having a volute with a volute entrance surrounding the outer periphery of the impeller; an additional seal positioned inwardly of the rear labyrinth seal to substantially seal a space behind the innermost part of the rear shroud; and means for pumping fuel from said substantially sealed space to the volute entrance, said means for pumping fuel from said substantially sealed space comprising, a shrouded secondary pump having a plate fixed to and spaced from said rear shroud with pumping ribs therebetween and having an inlet communicating with said substantially sealed space; said rear labyrinth seal being to the rear of said plate and said plate being spaced from the adjacent wall of the impeller cavity whereby there is a part of the impeller cavity to the rear of said plate which communicates with the volute entrance and is out of direct communication with said substantially sealed space; said volute entrance also communicating with the space between the front impeller shroud and adjacent impeller cavity wall whereby an imbalance of pressure forces acting on the rear of said plate and the front impeller shroud urges the planar thrust bearing toward the journal bearing planar section.

4,714,406

TURBINES

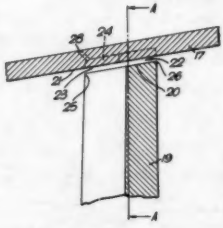
Geoffrey S. Hough, Littleover, England, assignor to Rolls-Royce plc, London, England

Continuation of Ser. No. 848,345, Apr. 4, 1986, abandoned, which is a continuation of Ser. No. 630,237, Jul. 12, 1984, abandoned. This application Jun. 25, 1987, Ser. No. 65,139

Claims priority, application United Kingdom, Sep. 14, 1983, 8324670

Int. Cl.[4] F01D *11/08*

U.S. Cl. 415—170 R **4 Claims**



1. A turbine comprising:

at least one annular array of rotary aerofoil blades having radially outer tips;

an annular gas passage, said annular array of rotary aerofoil blades being enclosed within said annular gas passage so that the axes of said array of aerofoil blades and said gas passage are coaxial; and

an annular member surrounding at least said radially outer tips of said aerofoil blades and having a radially inner surface which is in radially spaced apart relationship with said aerofoil blade tips, said annular member defining the radially outer boundary of at least a portion of the axial extent of said annular gas passage;

means in the portion of said radially inner surface which is adjacent said blade tips for directing the flow of any gas passing in operation through said turbine which flows

across the gap between said annular member and said blade tips as a boundary layer having a vorticity and defining a leakage to substantially follow an absolute ideal flow path for gases in the region of said aerofoil blade tips, said gas directing means imparting energy of the vortices to said blade tips with a reduction in loss of efficiency despite leakage of gases through said gap;

said gas directing means comprising a plurality of grooves spaced peripherally about said annular member with each groove being in the form of two slots which intersect at an angle to form a chevron.

4,714,407

AEROFOIL SECTION MEMBERS FOR TURBINE ENGINES

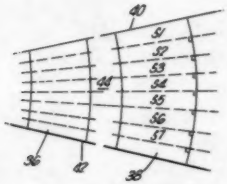
John C. Cox; Stephen E. Morgan; Martin Hamblett, and Alfred Rubini, all of Derby, England, assignors to Rolls-Royce plc, London, England

Filed Jul. 22, 1985, Ser. No. 757,260

Claims priority, application United Kingdom, Sep. 7, 1984, 8422662

Int. Cl.⁴ F04D *29/24, 29/54*

U.S. Cl. 415—192 **17 Claims**



1. An aerofoil for a gas turbine engine, the aerofoil having an aerodynamic profile defined by a number of elemental aerofoil sections stacked relatively to one another, the elements of the aerofoil trailing edge between the elemental aerofoil sections being arranged to define at least partially, the trailing edge of the aerofoil, the aerofoil trailing edge forming one boundary of the geometric throat window between adjacent aerofoils in an array of aerofoils, an elemental length of said trailing edge extending perpendicular to the local streamlines of the gas flow passing through said throat window.

4,714,408

RADIATOR FAN

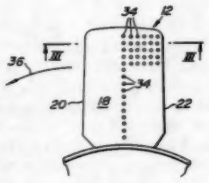
Takeshi Abe, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 5, 1986, Ser. No. 870,961

Claims priority, application Japan, Jun. 6, 1985, 60-121415

Int. Cl.⁴ F04D *29/38*

U.S. Cl. 416—91 **6 Claims**



1. A radiator fan comprising:

a plurality of blades adapted to rotate about an axis in a predetermined direction and extending radially outwardly from said axis, each having a leading edge and a trailing edge, each of said blades being contoured to provide a first surface extending from said leading edge to said trailing edge, and a second surface extending from said leading edge to said trailing edge, each of said blades causing a longer line of flow generated along said first surface than a line of flow generated along said second surface when said radiator fan rotates through fluid about said axis in said predetermined direction;

each of said blades having formed therethrough a number of passages, each having a fluid flow inlet opening disposed in said second surface and a fluid flow outlet opening being located within at least an area portion of said first surface bounded by a radially outermost edge of each of said blades;

wherein each of said number of passages extends from said fluid inlet opening to said fluid outlet opening in a predetermined direction which forms a predetermined acute angle with a direction of rotation of said blade, in order to allow the entrance of fluid into each passage when eddies are formed on said first surface of said blades.

4,714,409

HELICOPTER ROTOR

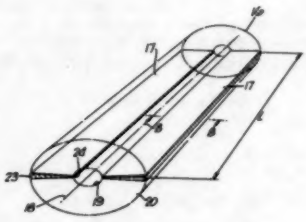
Samuel J. M. Denison, Marlow, and David P. Bashford, Ruislip, both of England, assignors to Westland plc, Yeovil, England

Filed Oct. 2, 1986, Ser. No. 914,626

Claims priority, application United Kingdom, Oct. 15, 1985, 8525342

Int. Cl.⁴ B64C *27/38*

U.S. Cl. 416—134 A **12 Claims**



1. A helicopter rotor including a rotor hub for rotation about an axis and a plurality of radially extending rotor blades each attached to the hub by an elongated flexure member to permit pitch changes and flap and lag movements of the attached rotor blade, wherein each flexure member includes a plurality of longitudinally extending reinforcing plates which in cross section extend generally radially for 360° around a geometric centre of the flexure member, said reinforcing plates being enclosed in a resilient matrix material.

4,714,410

TRAILING EDGE SUPPORT FOR CONTROL STAGE STEAM TURBINE BLADE

Bynum V. Hancock, King, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 18, 1986, Ser. No. 897,672

Int. Cl.⁴ F01D *5/30*

U.S. Cl. 416—193 A **18 Claims**

1. A rotatable blade for a steam turbine comprising:

a root portion;

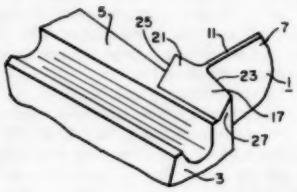
a root platform portion disposed radially outwardly with respect to the root portion;

an airfoil portion extending radially outwardly from the root platform portion and having a leading and a trailing edge;

said root platform portion having an extension which supports the trailing edge of the airfoil portion;

said extension being wedge shaped and having two generally

right trapezoidal surfaces and two triangular shaped sides; and



said root platform having a notch with a generally right trapezoidal surface which receives and supports the wedge shaped extension of the adjacent blade when the blades are disposed in a circular array on a steam turbine.

4,714,411

FLUID PRESSURE INTENSIFIER DEVICE

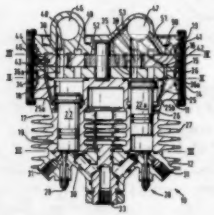
Robin H. J. Searle, Yeovil, England, assignor to Normalair-Garrett (Holdings) Limited, Yeovil, England

Filed Jun. 16, 1986, Ser. No. 874,863

Claims priority, application United Kingdom, Jun. 24, 1985, 8515944

Int. Cl.[4] F04B *9/08*

U.S. Cl. 417—246 **6 Claims**



1. In a fluid pressure intensifier device having a plurality of piston and cylinder compression stages of sequentially decreasing volume, flow passages for conducting fluid to be pressure intensified sequentially through said stages, and means for operating said stages in sequence to effect stagewise pressure intensification of fluid, the improvement comprising an individual pressure fluid powered driving mechanism for each said piston and cylinder compression stages, each of said driving mechanisms comprising a driving piston and cylinder assembly integrated with the compression stage associated therewith, said compression stages being arranged in a circle about an axis, and control means for causing said driving mechanisms to operate in sequence, said control means comprising a port plate rotatable about said axis and controlling pressure fluid inlet and outlet connections to the driving piston and cylinder assemblies, a positive displacement pressure fluid motor actuated by the pressure fluid powering said driving piston and cylinder assemblies for rotating said port plate, said positive displacement motor comprising a gerotor motor having an outer gear comprising said rotatable port plate.

4,714,412

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Wilfried Böhringer, Flein; Franz Eheim, Stuttgart; Gerald Höfer, Weissach-Flacht; Karl Konrath, Ludwigsburg, and Helmut Laufer, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

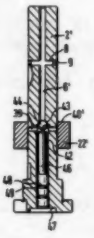
Division of Ser. No. 610,724, May 16, 1984, Pat. No. 4,649,883.

This application Dec. 15, 1986, Ser. No. 941,867

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1983, 3326973

Int. Cl.[4] F04B *49/02, 49/00*

U.S. Cl. 417—289 **13 Claims**



1. A fuel injection pump for internal combustion engines comprising a pump housing, a pump cylinder (**4**) in said pump housing, a reciprocating pump piston (**2'**) in said pump cylinder (**4**) which encloses a work chamber (**5**), a suction chamber (**16**) in said pump housing, an intake bore (**15**) in said pump housing and said pump cylinder through which said work chamber can be supplied with fuel from said fuel suction chamber in said pump housing during an intake stroke, a valve (**20**) in said intake bore between said fuel suction chamber and said work chamber for shutting off a fuel supply from said fuel suction chamber to said work chamber, said work chamber being connected during at least a portion of a supply stroke of said pump piston with at least one fuel injection line in said pump housing that leads to an injection valve of an engine, a longitudinal extending relief conduit (**6'**) in said pump piston which leads exclusively from said work chamber to a transverse conduit (**39**) that leads to a radially extending relief opening located in the pump piston, said relief opening being closable by means of a quantity adjusting device (**22**) that is axially displaceable on a portion of said pump piston which protrudes into said fuel suction chamber of said pump housing that is filled with fuel under pressure and beyond a pump piston stroke determined by an axial position of said quantity adjusting device, said relief opening being adjustable into communication via a control edge (**40**) of said quantity adjusting member with said suction chamber, said longitudinally extending relief conduit is said pump piston includes a conduit segment (**42**) of larger diameter than said relief conduit (**6'**) which extends from above said transverse conduit (**39**) to a lower end of said piston, a stop (**46, 55**) disposed in said conduit segment (**42**) of larger diameter below said transverse conduit (**39**), and a check valve (**44**) which opens in the fuel flow direction and closable upon a suction stroke of the pump piston is disposed in said conduit segment of larger diameter in said pump piston juxtaposed said transverse conduit (**30**), and a valve seat for said check valve at a transition between the diameters of said relief conduit and said conduit segment including said stop.

4,714,413

SPEED SENSITIVE POWER STEERING PUMP UNLOAD VALVE

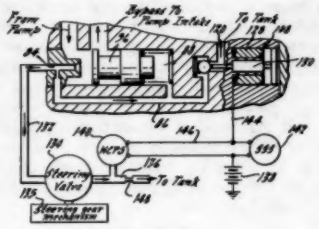
James J. Duffy, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

PCT No. PCT/US82/00486, § 371 Date Apr. 16, 1982, § 102(e) Date Apr. 16, 1982, PCT Pub. No. WO83/03581, PCT Pub. Date Oct. 27, 1983

PCT Filed Apr. 16, 1982, Ser. No. 386,850

Int. Cl.[4] F04B *49/02, 49/00*

U.S. Cl. 417—293 **6 Claims**



1. In a power steering system having a fluid pressure operated steering valve and a steering gear mechanism, a power steering pump and a fluid circuit interconnecting the pump and the steering valve, the improvement comprising:

a pressure regulating flow control valve for the power steering pump;

said pump having a high pressure flow delivery passage and a low pressure return passage;

said flow control valve being situated in and partly defining said circuit for establishing controlled communication between said high pressure passage and said return passage;

means for subjecting a pressure differential force on said flow control valve that is proportional in magnitude to the fluid flow delivered by said pump whereby an increased fluid flow delivery by the pump is accompanied by an increase in the pressure forces tending to increase bypass flow from said delivery passage to said return passage;

and vehicle speed sensitive valve means for deactivating said flow control valve by eliminating the flow proportional differential force acting on said flow control valve at speeds greater than a predetermined value whereby the flow control valve acts solely as a pressure regulator bypass valve.

4,714,414

PLURAL-STAGE GAS COMPRESSOR

Bernard F. Miller, Corning, N.Y., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Sep. 26, 1986, Ser. No. 911,795

Int. Cl.[4] F04C *18/356, 23/00, 29/02, 29/04*

U.S. Cl. 418—11 **7 Claims**

1. A plural-stage gas compressor, comprising:

a gear housing;

said housing having (a) a pair of spaced-apart, parallel, side walls, and (b) a gear chamber formed therewithin;

a driving gear rotatably confined within said chamber;

a primary, driven gear interpositioned between said walls, and in meshed, driven engagement with said driving gear;

a secondary, driven gear interpositioned between said walls, and in meshed, driven engagement with said primary, driven gear;

a primary shaft (a) coupled to said primary gear for rotation therewith, and (b) journalled in said walls rotatably supporting said primary gear in said chamber on a rotary axis; and

a secondary shaft (a) coupled to said secondary gear for rotation therewith, and (b) journalled in said walls, rotatably supporting said secondary gear in said chamber, on a rotary axis; wherein

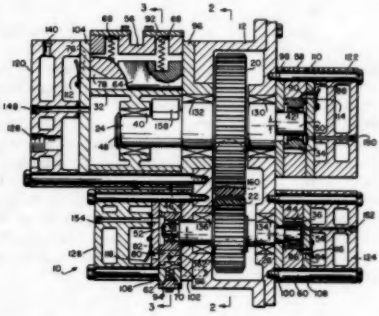
each of said shafts has integral pins, on opposite ends thereof, eccentric to, albeit parallel with, said rotary axis of its associated shaft; and

said pins of each said shaft are parallel to each other, albeit having eccentricities which dispose them at a given angular distance apart from each other, relative to said rotary axis of their associated shaft; further including

separate compartments, defining gas compression chambers therewithin, replaceably fixed to external surfaces of said walls; wherein

each of said compartments has (a) a circumferential wall and a gas inlet port formed in said circumferential wall for admitting gas therethrough, radially, into said compression chamber of said compartment, and (b) an outer, end plate, at an outermost, axial end, and in closure, of said compression chamber;

each of said end plates has a gas outlet port formed therein for admitting gas therethrough, axially, from said compression chamber associated therewith; and including



an outer, removable header coupled to, and parallel with, each of said end plates; wherein

each of said headers has means therewithin subdividing said header into a plurality of galleries;

one of said galleries have valving means therewithin for controlling a conduct of gas through said outlet port from an associated gas compression chamber;

another of said galleries comprises means for cooling said one gallery;

said cooling means comprises means for conducting coolant through said another gallery,

each of said headers comprises means in traverse of end plat and said header, and isolated from fluid communication with said galleries, for injecting coolant, axially, into its associated gas compression chamber;

each of said compression chambers has a rotary piston confined therein; and

each of said pins has one of said rotary pistons journalled thereon.

4,714,415

SCROLL COMPRESSOR WITH CLOSED COMPRESSION SPACES HAVING VALVES TO REDUCE STARTING TORQUE

Takao Mizuno; Naoshi Uchikawa; Akira Murayama; Takahiro Tamura, and Ryoichi Kuroshima, all of Shimizu, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 5, 1986, Ser. No. 893,177

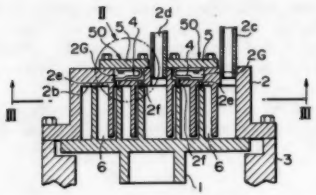
Claims priority, application Japan, Aug. 27, 1985, 60-186625

Int. Cl.[4] F04C *18/04, 29/10*

U.S. Cl. 418—14 **4 Claims**

1. A scroll compressor including an orbiting scroll means

and a fixed scroll means, each of said scroll means including an end plate and a spiral wrap formed on said end plate in an upstanding position, said orbiting and fixed scroll means being assembled together with wraps thereof meshing inwardly with each other, and said orbiting scroll means is driven to execute an orbital motion relative to said fixed scroll means so that a plurality of closed spaces defined at symmetrical positions by the wraps and end plates of said orbiting and fixed scroll means are successively reduced in capacity while moved toward a center of said fixed and orbiting scroll means, and communicate with a discharge port provided in said fixed scroll means after the reduction in capacity, wherein two valve chamber



means are symmetrically formed at positions on the end plate of said fixed scroll means, sealing flange means are provided for closing said valve chamber means, first and second communication port means are provided and open into each valve chamber means for communicating with a closed space in mid course of a compression stage and for communicating with another closed space of a minimum capacity which is further advanced toward a discharge side of the compressor than the closed space in mid course of the compression stage and located just before a communication with the discharge port, and valve plate means for opening and closing said respective first communication port means are provided on inner walls of said sealing flange means.

4,714,416

QUIET RUNNING COMPRESSOR

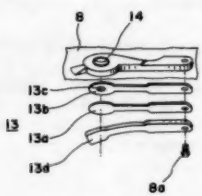
Kiyoshi Sano, Shiga, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 23, 1985, Ser. No. 758,076

Claims priority, application Japan, Jul. 26, 1984, 59-155825

Int. Cl.[4] **F04C** *18/344;* **F16K** *15/16*

U.S. Cl. 418—63 **2 Claims**



1. A valve arrangement for a compressor for compressing fluid, the compresor having a sealed casing having a suction inlet and a discharge outlet spaced from the suction inlet on the casing, a cylinder mounted within the casing and having an inlet opening extending radially therethrough open at one to and communicating with the suction inlet, a piston driven within the cylinder for drawing in fluid from the suction inlet and for compressing the drawn in fluid, and a discharge section having a discharge port extending therethrough having one end open to and communicating with the cylinder for allowing the compressed fluid to discharge therethrough to the discharge outlet, said valve arrangement comprising:

a first resilient plate having one end fixed relative to said cylinder and the other end positioned against said discharge section over the other end of the discharge port, said other end of said first resilient plate having a portion partially covering said discharge port and a hole extending therethrough coaxial with said discharge port, the ratio of the cross-sectional area of said hole to the cross-sectional area of said discharge port being between 0.05 and 0.3 for minimizing the force exerted by the compressed fluid discharged through said discharge port onto said other end of said first resilient plate thereby reducing noise associated with the contact of said other end of said first plate with said discharge section when said first plate is deflected away from said discharge section and off of said discharge port under the influence of said force; and

a second resilient plate overlying said first resilient plate opposite said discharge port, said second resilient plate having one end fixed relative to said cylinder and the other end positioned against said other end of said first resilient plate and over said hole for covering said hole and said other end of said discharge port, said second resilient plate being deflected away from the discharge section by said force exerted by the compressed gas discharging through the discharge port to uncover said hole and the discharge port.

4,714,417

INTERNAL AXIS SINGLE-ROTATION MACHINE WITH INTERMESHING INTERNAL AND EXTERNAL ROTORS

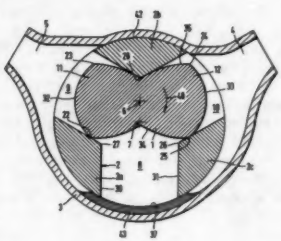
Felix Wankel, Eichwaldstrasse 54, D-8990 Lindau, Fed. Rep. of Germany

Filed Jun. 12, 1985, Ser. No. 743,786

Claims priority, application Switzerland, Jun. 12, 1984, 2822/84

Int. Cl.[4] **F01C** *21/12, 1/10;* **F04C** *15/02, 2/00*

U.S. Cl. 418—159 **2 Claims**



1. An internal axis single-rotation machine comprising:

a casing defining an internal machine volume which is partially enclosed by diametrically facing sealing parts defined by internal wall portions of said casing and having inlet means and outlet means for effecting fluid flow through said internal volume;

an internal rotor and an external rotor having a generally circular outer periphery both mounted within said casing for rotation about their own centers of gravity at different angular velocities;

said internal rotor having a cross-sectional configuration defining a number of lobes having external peripheral faces and lateral faces which meet each other at radially external sealing corner areas;

said external rotor having a cross-sectional configuration defining internal lateral faces defining a number of recesses, which faces meet each other at internal sealing corner areas;

peripheral surface areas defined on said outer periphery of said external rotor arranged to engage with said diametrically facing sealing parts of said casing to maintain a continuous sealing contact therebetween during rotation of said external rotor relative to said casing thereby to

prevent fluid flow through said internal volume around the outer periphery of said external rotor;

said internal rotor and said external rotor rotating at angular velocities having a ratio therebetween which corresponds to the ratio between said number of lobes and said number of recesses and being arranged in a cooperating rotating relationship during relative rotation thereof, wherein a continuous sealing engagement between said rotors is maintained in that

said radially external sealing corner areas of said internal rotor kinematically describe said internal lateral faces of said external rotor,

said internal sealing corner areas of said external rotor kinematically describe said external peripheral faces of said internal rotor, and

a meshing gear-like contact is maintained between said internal lateral faces of said external rotor and said laterla faces of said internal rotor,

said internal rotor extending to the periphery of said external rotor at certain points during the relative rotation therebetween, with said recesses of said external rotor extending to the periphery of said external rotor to open radially outwardly thereof and moving past said inlet means and said outlet means of said casing;

said internal lateral faces of said external rotor being flat with said internal rotor and said external rotor rotating relative to one another with a speed ratio of 3:2.

4,714,418

SCREW TYPE VACUUM PUMP

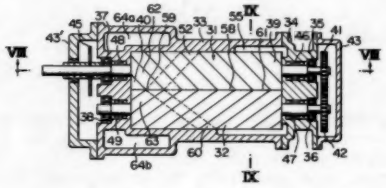
Katsumi Matsubara; Riichi Uchida; Masatoshi Muramatsu, all of Ibaraki; Kotaro Naya, Ebina, and Tsuneharu Takagi, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 13, 1985, Ser. No. 701,199

Claims priority, application Japan, Apr. 11, 1984, 59-70830; Dec. 26, 1984, 59-272860

Int. Cl.[4] F04C *18/16*

U.S. Cl. 418—201 **19 Claims**



1. A screw vaccum pump comprising:

a male rotor having a plurality of spiral lands and grooves and a shaft portion and operative to rotate about said shaft portion;

a female rotor having a plurality of spiral lands and grooves and a shaft portion and operative to rotate about said shaft portion while being maintained in meshing engagement with said male rotor; and

casings defining a space for containing said two rotors and providing a suction port and a discharge port communicating with said space;

said two rotors each having a wrap angle related to the position of said suction port and the position of said discharge port, said wrap angles being greater than 360°;

a plurality of working chambers defined by said two rotors and said casings including a plurality of sealed working chambers out of communication with both the suction port and the discharge port, said plurality of sealed working chambers comprising a plurality of working chambers having their volume reduced when the two rotors rotate while being maintained in meshing engagement with each other, and a plurality of working chambers having their volumes maintained substantially constant when the two rotors rotate while being maintained in meshing engagement with each other, and wherein at least one of said working chambers having their volume reduced and at least one of said working chambers having their volume maintained substantially constant are provided in each of the grooves and separated from each other by meshing portions of said two rotors.

4,714,419

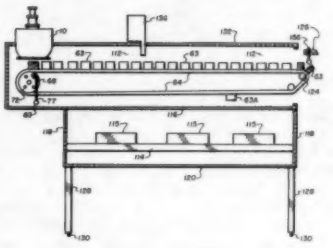
CANDY DISPENSING APPARATUS

A. Lamont Nielsen, 2392 E. 2900 South, Salt Lake City, Utah 84109

Continuation-in-part of Ser. No. 595,322, Mar. 30, 1984, abandoned. This application May 21, 1986, Ser. No. 866,460

Int. Cl.[4] B29C *41/22, 41/42;* B67D *5/00*

U.S. Cl. 425—126 S **10 Claims**



1. A transfer clamp for use in removing articles from a conveyor belt, said clamp comprising:

at least one first elongate panel, having a longitudinal axis, defining at least one substantially "V"-shaped slot spacedly positioned along one side of said first panel, said "V"-shaped slot having an interior region dimensioned to receive a stick portion of a lollipop mold assembly;

at least one second elongate panel positioned parallel and adjacent said first panel, said second panel defining at least one substantially "L"-shaped slot spacedly positioned along one side of said second panel to register with the positioning of said "V"-shaped slot, said "L"-shaped slot having an elongate inlet channel and a retention channel;

a first drive means associated with said second panel for displacing said second panel along said first panel between two conditions, a first condition wherein an interior region of said "V"-shaped slot is aligned with said inlet channel of said "L"-shaped slot, whereby a stick may be inserted into said aligned slots, and a second condition wherein said interior region of said "V"-shaped is not aligned with said inlet channel of said "L"-shaped slot, wherein said retention channel of said "L"-shaped slot in association with said interior region of said "V"-shaped slot substantially encircle of stick inserted into said "V"-shaped slot.

4,714,420

PLANT FOR THE CONTINUOUS AND AUTOMATED MANUFACTURING OF AGGLOMERATED SINTERED, VULCANIZED AND PRESSED ARTICLES

Milorad S. Milisavljevic, Lucerne, Switzerland, assignor to PTP Patentierte Technologische Prozesse AG, Lucerne, Switzerland

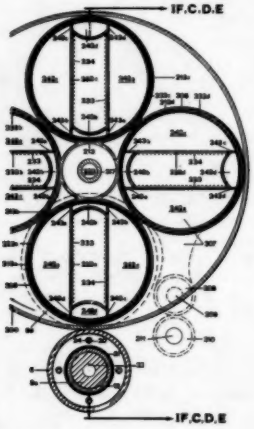
PCT No. PCT/CH83/00142, § 371 Date Aug. 19, 1985, § 102(e) Date Aug. 19, 1985, PCT Pub. No. WO84/02493, PCT Pub. Date Jul. 5, 1984

PCT Filed Dec. 14, 1983, Ser. No. 770,865

Claims priority, application Switzerland, Dec. 20, 1982, 7401/82

Int. Cl.[4] B29C *33/34*

U.S. Cl. 425—161 **57 Claims**



1. In a plant for a manufacture in an automated and continuous manner of agglomerated, sintered and vulcanized articles, which are formed by converting and pressing materials, including minerals, synthetics, mixtures and alloys, which has at least one forming element to press or compress materials fed into a mold by feeding elements, at least one element for a thermal, chemical, mechanical or similar treatment of the pressed articles, and at least one device to remove manufactured articles from the mold, the improvement wherein a frame is provided which carries the whole plant, in order to feed the material into one or more working units positioned on the frame around the feeding elements, whereby each working unit is divided into fixed sectors each serving as a base for a press forming element and/or treatment element and/or one element for the removal from the mold are tightly fixed on the frame and a carousel is fixed on the frame, said carousel being provided with a number of mobile sectors equal to the number of said fixed sectors and turning with respect to the fixed sectors for transporting part of each mold or the formed articles from one fixed sector of the working unit to the next fixed sector of the working unit.

4,714,421

QUICK-SWITCH MOLD SET WITH CLAMP MEANS

Nicholas D'Agostino, Pompton Lakes, N.J., assignor to National Tool & Manufacturing Co., Inc., Kenilworth, N.J.

Filed Feb. 11, 1987, Ser. No. 13,641

Int. Cl.[4] B29C *45/26*

U.S. Cl. 425—192 R **21 Claims**

1. A quick-switch mold set which is constructed so that a mold cavity may be formed in mold plates which are carried in that portion which is secured by selectively manipulable clamp means, this mold set having means for clamping in a selected position to upper and lower platens in molding apparatus, the quick-switch mold set having the quick-switch removable portion containing desired aligning means, the construction of the quick-switch mold set including:

(a) a top clamping housing member adapted to receive and retain a sprue bushing including a nozzle-receiving means and a sprue passageway therethrough for molten material, said housing member including inwardly-facing grooves disposed in an opposed and facing position;

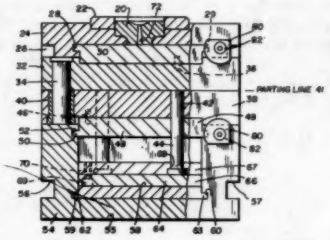
(b) a first upper-T-plate having ear portions sized to be precisely slideably in the grooves in said top clamp housing member and with a stop limit for laterial movement of these ears of said T-plate in the grooves, and with said T-plate movable for interchanging mold sets in an in-and-out direction;

(c) an upper interchangeable mold plate removably retained in the mold set and means for retaining alignment and positioning with said first T-plate;

(d) a lower interchangeable mold plate selectively adapted to be brought to a contiguous face relationship and establishing a parting line with the upper mold plate, this mold plate also removably retained in this mold set for interchanging;

(e) a plurality of leader pins and bushings arrayed and disposed to be retained in the upper and lower mold plates and maintain alignment during open and closed condition, these leader pins and bushings remaining with and as the upper and lower mold plates are removed for the interchange;

(f) a bottom clamping housing having upstanding side portions extending upwardly to the leader pins and bushings



and providing a stop surface for said pins and bushings, said bottom clamping housing side portions having inwardly-facing and opposed grooves;

(g) a second intermediate T-plate having ear portions sized to be slideable in the opposed grooves in the side portions of the bottom clamping housing and with a stop limit for lateral movement of the T-plate provided by the side portion of the bottom clamping housing, and means for retaining said second lower mold plate in alignment with said intermediate T-plate;

(h) a plurality of return pins disposed to be carried in and movable in holes in the intermediate T-plate and lower mold plate;

(i) plate means for securing said plurality of return pins so as to maintain said return pins in a common plane and attitude during molding;

(j) at least one upper clamp which is secured and carried by the top clamping housing and with said clamp disposed so as to be selectively movable from a tightened condition where said clamp retains the ear portion of the upper first T-plate and upper mold plate and, when loosened, is moved to a pass condition whereby said upper first T-plate and upper mold plate are adapted to pass said upper clamp when interchange is to be made, and

(k) at least one lower clamp which is secured and carried by said bottom clamp housing and with said clamp disposed so as to be selectively movable from a tightened condition where said clamp retains an ear portion of the second intermediate T-plate and lower mold plate and, when

loosened, this lower clamp is moved to a pass condition whereby said lower mold plate and second intermediate T-plate are adapted to pass said lower clamp when interchange is to be made.

4,714,422

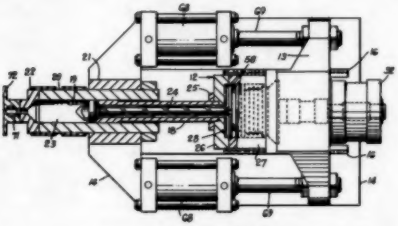
ROTARY PLASTICATOR SCREW INJECTION MACHINE

Gregory W. Meeker, Webster; Norris E. Bleck, Rochester, both of N.Y.; Marc A. Rizzi, Orange, and Carl M. Irick, Monroe, both of Conn., assignors to Farrel Corporation, Ansonia, Conn.

Continuation of Ser. No. 612,682, May 22, 1984, abandoned. This application Dec. 12, 1985, Ser. No. 808,231

Int. Cl.[4] B29C *45/02*

U.S. Cl. 425—204 **8 Claims**



1. Apparatus for injection molding plastic articles including the combination of:

a base,

a rotary processor for plasticating plastic and polymeric material and mounted on said base for guided reciprocation, said processor comprising a housing having a rotor mounted for rotation in said housing, the rotor having a plurality of annular channels which provide moving surfaces of a plurality of annular passages which passages are closed by a mating surface of the housing, the housing having an inlet through which material to be plasticated is fed to at least one of the passages and fixed members projecting from the housing into the channels for restraining the material to be acted on by the moving surfaces and to direct the material to successive passages and toward an outlet section of the housing;

an elongate screw rotatable in a sleeve, an end of said sleeve being secured to and extending from the processor housing into a bore in a barrel, with a first end of the screw communicating with the outlet section of the processor and a second end of the screw communicating with a chamber formed in the bore at an other end of the sleeve;

motor means for rotating the rotor and the screw in unison for plasticating and otherwise operating on the material fed through the inlet and successive passageways, through the outlet section and along the screw into the chamber, the sleeve and the barrel being fixedly mounted to the processor housing for enlarging the chamber by reciprocation of the processor housing relative to the base, to accommodate plasticated material fed by the screw and for reducing the volume of the chamber for forcing the plasticated material therefrom;

and piston cylinder means acting between the barrel and the processor housing for following retraction of the sleeve during enlargement of the chamber and for driving the sleeve and screw therein axially in a direction opposite said retraction for forcing the plasticated material from the chamber.

4,714,423

EVACUATING DEVICE FOR PLUNGER MOLDING APPARATUS

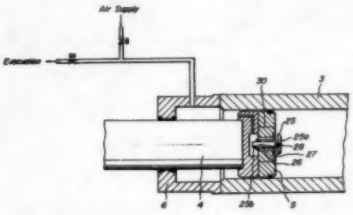
Isao Hattori, and Shigeru Furukawa, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Japan

Filed Dec. 29, 1986, Ser. No. 947,830

Claims priority, application Japan, Dec. 13, 1986, 61-191133[U]

Int. Cl.[4] B29C *47/54, 47/76*

U.S. Cl. 425—376 R **3 Claims**



1. An apparatus comprising:

a material cylinder for receiving a blank to be extruded, a ram head slidably engageable in said material cylinder, a hydraulic plunger having a piston connected to said ram head, an evacuating cap provided slidably in an air-tight manner on said piston and having evacuating pipes, and a blowdown valve provided in said ram head for closing an opening an air blow aperture formed in said ram head, wherein said ram head comprises a flat surface which is in contact with said blank in said material cylinder, and an O-ring arranged in said flat surface of said ram head about said air blow aperture, and said blowdown valve comprises a T-shaped head which is movable into contact with said flat surface of said ram head through said Oring to close said air blow aperture when the ram head is being advanced in said material cylinder to extrude said blank therefrom.

4,714,424

VACUUM MOLD

Toshiyuki Kinugasa; Tamio Furuya, both of Hidaka; Yoshiki Ishige, Tokorozawa; Yuichi Tsuchimoto, Sakado, and Shoji Takahashi, Iruma, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 15, 1985, Ser. No. 787,774

Claims priority, application Japan, Oct. 18, 1984, 59-219173; Apr. 5, 1985, 60-71987

Int. Cl.[4] B29C *51/10*

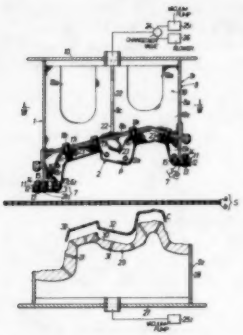
U.S. Cl. 425—388 **22 Claims**

1. A vacuum mold for vacuum-forming a heated plastic sheet with an imprinted grain pattern on the surface of the sheet, said mold comprising:

an electrocast shell including a microporous body having a front casting surface with a grain pattern thereon, said microporous body having a multitude of fine vacuum holes uniformly distributed at said front casting surface, and

a back-up body on the rear surface of the microporous body, said back-up body comprising a multitude of adjoining small particles in contact with one another at contact points thereof, said particles being connected to one another at said contact points and providing vent spaces between said particles, said vent spaces being in communication with said fine vacuum holes in said microporous body, said back-up body comprising a first layer on said electrocast shell and a second layer laminated on said first layer, said particles in said first layer including a multitude

of adjoining steel balls connected at contact points by a thermosetting plastic, said particles in said second layer



including a multitude of adjoining glass particles connected at contact points by the thermosetting plastic.

4,714,425

PREPARATION OF A PLASTIC FOR ITS EXTRUSION PARTICULARLY IN THE FORM OF A GAGED BEAD INTENDED TO BE USED AS A SEAL AND INTERLAYER IN MULTIPLE GLAZINGS

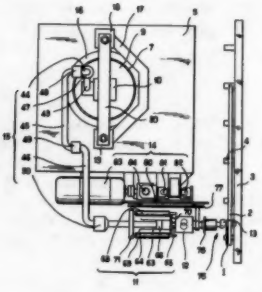
Karl Lenhardt, Neuhausen-Hamberg, Fed. Rep. of Germany, assignor to Saint-Gobain Vitrage, Courbevoie, France

Filed Jul. 10, 1985, Ser. No. 753,608

Claims priority, application France, Jul. 10, 1984, 84 10946; Sep. 17, 1984, 84 14181; Sep. 17, 1984, 84 14182; Sep. 17, 1984, 84 14183; Sep. 17, 1984, 84 14184

Int. Cl.[4] B29C *47/92*

U.S. Cl. 425—461 **17 Claims**



1. An installation for preparing a plastic material of the type having a butyl rubber base from a mass of said material in the raw state having a high viscosity and a high hardness, and for extruding said plastic in the form of a gaged bead having a viscosity and a hardness lower than those of said material in the raw state, comprising:

a tank containing raw plastic material and having a cover applied with pressure against said material, said cover having an outlet orifice and a shape such that the section of the volume of material enclosed by said cover is smaller the closer said material is to said outlet orifice, said cover also being equipped on a face thereof oriented toward the material with heating appendages that can plunge into said material,

a first pump in fluid communication with said outlet orifice for providing a continuous delivery of said material under a high pressure,

variable volume magazine means located downstream from said pump in a direction of material flow, for providing continuous delivery of said material under pressure, said magazine means consisting of a cylinder and a piston returned to the inside of the cylinder with a constant force less than the force exerted by the material feeding said magazine, and

an output nozzle downstream from said magazine.

4,714,426

IGNITION SYSTEM FOR OIL BURNER

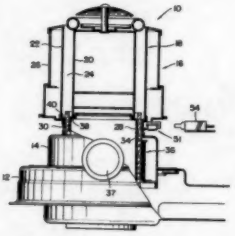
Yutaka Nakanishi, Kounan; Toshihiko Yamada, Aichi; Yuji Sanada, Aichi, and Takashi Kawai, Aichi, all of Japan, assignors to Toyotomi Kogyo Co., Ltd., Aichi, Japan

Filed Dec. 24, 1986, Ser. No. 946,223

Claims priority, application Japan, Dec. 28, 1985, 60-204586[U]; Jun. 28, 1986, 61-99745[U]; Jun. 28, 1986, 61-99746[U]

Int. Cl.[4] F23Q *2/08*

U.S. Cl. 431—132 **14 Claims**



1. An ignition system for an oil burner including a wick arranged between outer and inner cylinders of a wick receiving construction and raised at an upper end portion thereof to a lower portion of a combustion cylinder construction placed on said wick receiving construction, comprising:

an ignition window provided at an upper region of said outer cylinder of said wick receiving construction;

a closing door for tightly closing said ignition window, said closing door being movably arranged opposite to said ignition window;

a door actuating means for actuating said closing door;

an actuation arm arranged so as to be pivotally movable;

an ignition heater mounted on said actuation arm so as to be approachable to said ignition window;

a connection means for operatively connecting said actuation arm to said door actuating means to actuate said closing door in synchronism with said actuation arm, to thereby open said ignition window when said ignition heater is approached to said ignition window; and

an actuation regulator for setting pivotal movement of said actuation arm within a predetermined range.

4,714,427

FIXING DEVICE FOR COPYING MACHINE

Ichiro Tsuruoka, Tokyo, and Mitsuru Takahashi, Miyagi, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 817,824, Jan. 10, 1986, abandoned. This application Apr. 6, 1987, Ser. No. 36,128

Claims priority, application Japan, Apr. 26, 1985, 60-088877

Int. Cl.[4] F27B *9/28*; H05B *1/00*; F26B *3/18*

U.S. Cl. 432—59 **6 Claims**

1. A fixing device for use in a wet-type copying machine, comprising:

a main rotatable body;

means for heating said main rotatable body; and

means for holding a sheet, which has a front side and a back side and carries on its front side a wet-type unfixed toner image, against said main rotatable body as heated by said

heating means over a predetermined interval on the main rotatable body to allow the toner image to be fixed to the sheet and also to allow the sheet to be fed by said main rotatable body;

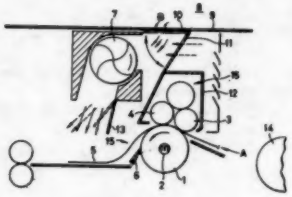
wherein:

the back side of said sheet makes contact with the main rotatable body while the front side, which carries said wet-type unfixed toner image, faces away from the main rotatable body and makes contact with said means for holding;

the surface of the main rotatable body which makes contact with the back side of the sheet is smooth; and

the surface of the means for holding which makes contact with the front side of the sheet has a multiplicity of fine projections;

said holding means comprises an auxiliary roller adjacent



to said main rotatable body for concurrent rotation therewith so that portions of said auxiliary roller and said main rotatable body will move in one direction, said main rotatable body and said auxiliary roller being capable of feeding a sheet held therebetween;

said main rotatable body comprises a main roller heated by said heating means; and

said auxiliary roller comprises at least two auxiliary rollers spaced from each other, said main roller and adjacent ones of said auxiliary rollers being relatively positioned such that an angle formed between a first line tangential to both said main roller and an upstream one of said adjacent auxiliary rollers in the direction of feed of the sheet and a second line tangential to the downstream auxiliary roller at point where said first line intersects the peripheral surface of said downstream auxiliary roller is an obtuse angle.

4,714,428

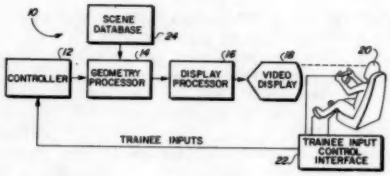
METHOD OF COMPREHENSIVE DISTORTION CORRECTION FOR A COMPUTER IMAGE GENERATION SYSTEM

William M. Bunker, and Donald M. Merz, both of Ormond Beach, Fla., assignors to General Electric Company, Philadelphia, Pa.

Continuation of Ser. No. 810,737, Dec. 19, 1985, abandoned. This application Jan. 28, 1987, Ser. No. 9,649

Int. Cl.[4] G09B *9/00*

U.S. Cl. 434—43 **38 Claims**



1. In an image generating system of the type for converting digital data into a sequence of display frames of image data in projector space suitable for display on a video image system in viewer space, the image system forming a display by individually illuminating each of a plurality of color pixels, each of the frames of image data defining a plurality of faces and each of the frames being divided into a plurality of spans, including an electronic control means for converting the digital data, a method for correcting for geometric distortion and optical distortion comprising the steps of:

(a) identifying data for a frame of display, the data defining face locations in viewer space, each of the faces associated with at least one span and being arranged in a descending order of priority;

(b) calculating transformation coefficients for mapping projector space span corners into viewer space;

(c) determining the highest priority face for each span;

(d) determining an area within a viewer space span covered by the highest priority face;

(e) computing pixel image data representative of the pixels within the projector space span covered by the face;

(f) repeating step (c) through step (f) until the last face is processed into pixel image data or until all areas of the spans are fully covered by faces; and

(g) transferring the pixel image data to the video image system.

4,714,429

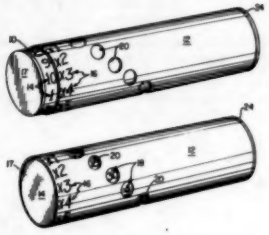
ARITHMETIC EDUCATIONAL DEVICE

Morton Phillips, 67-70 Yellowstone Blvd., Forest Hills, N.Y. 11375

Filed Dec. 22, 1986, Ser. No. 945,369

Int. Cl.[4] G09B *19/02*

U.S. Cl. 434—198 **7 Claims**



1. An educational device comprising an outer cylinder and an inner cylinder within said outer cylinder, said inner cylinder having an end extending from said outer cylinder and being rotatable and axially movable with respect to said outer cylinder, said inner cylinder having a series of first numbers peripherally arrayed around the end extending from said outer cylinder, said outer cylinder including a series of windows and a series of second numbers peripherally arrayed around the end from which the inner cylinder extends such that each of said second numbers can be aligned with each of said first numbers when said end of the inner cylinder extends from the outer cylinder by rotating one of said cylinder, said inner cylinder further including rows of third numbers corresponding to an arithmetic operation between said first numbers and said second numbers, said third numbers being physically arranged on said inner cylinder relative to said windows so that said third numbers do not appear in said windows when said inner cylinder extends from said outer cylinder but said third numbers appear in said windows when said inner cylinder is inserted into said outer cylinder so as to reflect the result of an arithmetic operation between aligned first and second numbers.

4,714,430
ELECTRIC CONTACT DEVICE FOR PROTECTIVE GAS BAG IMPACT INSTALLATIONS IN AUTOMOTIVE VEHICLES

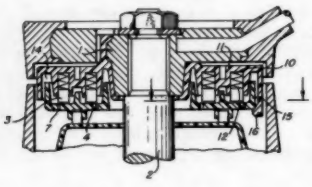
Gregor Zeiler, Aschaffenburg, Fed. Rep. of Germany, assignor to Petri A.G., Fed. Rep. of Germany

Filed Mar. 24, 1986, Ser. No. 842,948

Claims priority, application European Pat. Off., Mar. 23, 1985, 85103482.7

Int. Cl.⁴ H01R *39/00*

U.S. Cl. 439—15 **14 Claims**



1. A continuous contact electrical connector for installation in a vehicular steering wheel assembly comprising:

an annular housing exhibiting a fixed contact path disposed in an annular bottom trough of said housing;

a cover mounted to rotate with a steering wheel exhibiting a ring contact disposed in an annular groove aligned with said contact path;

a plurality of springs located between said ring contact and said cover, in said annular groove, biasing said ring contact downward against said contact path.

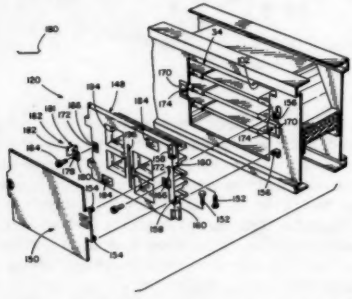
4,714,431
ELECTRICAL DISTRIBUTION SYSTEM HAVING AN IMPROVED PLUG-IN ASSEMBLY FOR CURRENT TAP-OFF

Gilbert A. McGoldrick, Hamilton, Ohio, and Allan E. Slicer, Brookville, Ind., assignors to Square D Company, Palatine, Ill.

Filed Sep. 13, 1984, Ser. No. 650,378

Int. Cl.⁴ H02G *5/08*

U.S. Cl. 439—212 **7 Claims**



1. A plug-in busway section having a pair of side rails, each including a top portion, a bottom portion and a main side portion, and

a plurality of plug-in openings located along the length of the section to facilitate tap-off from such locations to bus bars which are spaced apart at those locations, the improvement comprising:

an insulating base providing separate openings to each of said bus bars, said base having a first pair of support posts along one side of said base, each support post having an opening for receiving a fastener.

a door for covering said base, said door having a first pair of ears extending outward from one side of said door, each ear overlapping a respective one of said posts and, having an opening in registration with a respective opening in one of said posts,

a second pair of ears extending from said main side portion of said rail in generally parallel relationship with the respective first pair of ears, said second pair of ears each having an opening in registration with a respective opening in said first pair of ears and a respective opening in one of said posts; and

a first fastener extending through one of said first ears, one of said second ears and into said opening in one of said posts, and

a second fastener extending through the other first ear, the other second ear and into said opening in the other post.

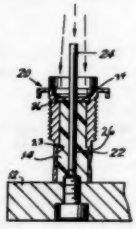
4,714,432
HERMETIC SEAL FOR ELECTRICAL COAXIAL CONNECTOR

Richard A. Huggins, Islip Terrace, N.Y., assignor to Automatic Connector, Inc., Commack, N.Y.

Filed Dec. 5, 1985, Ser. No. 804,921

Int. Cl.⁴ H01R *13/52*

U.S. Cl. 439—271 **10 Claims**



1. A method for forming a hermetic seal without using a glass seal for a coaxial connector which comprises a center contact surrounded by a body, a form configured between said center contact and said body, said non-glass hermetic seal being located in said form, said method comprising the steps of:

assembling said center contact, said body and a holder as one unit to provide said form between said center contact and said body,

vertically holding said unit on said holder,

forming said non-glass hermetic seal by the steps of

applying a material consisting essentially of a light curable viscous chemical compound to fill the form between said center contact and said body, and

supplying light to said compound to cure said viscous chemical compound and thereby form said non-glass hermetic seal effectively only by said light cured compound.

4,714,433
ELECTRICAL CONNECTOR WITH POSITION ASSURANCE AND DOUBLE LOCK

Frederick H. Rider, Jr., Youngstown, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 21, 1987, Ser. No. 5,607

Int. Cl.⁴ H01R *13/639*

U.S. Cl. 439—310 **3 Claims**

1. In combination with first and second electrical connector bodies that are movable together from a separated to a fully mated position, a cooperating primary and secondary lock means to assure that the connector bodies reach the fully mated position and to provide double locking between the connector bodies, comprising,

a cantilevered primary locking arm on the first connector body extending from a base, said base further including a

keeper projection extending in the opposite direction to said locking arm,

a latching member on the second connector body with which said primary locking arm engages as said connector bodies are moved to the fully mated position, thereby providing a primary lock between said fully mated connector bodies, said arm remaining only partially engaged with said latching member when said connector bodies are only partially mated, and,

a secondary locking arm on the second connector body extending from a pivot to a forward camming end, said secondary locking arm being being rotatable about said

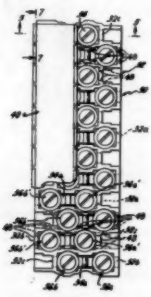
pivot by pushing said camming end toward said second connector body, thereby engaging said camming end and said keeper projection to move said first connector body toward said second connector body, when said connector bodies are only partially mated, and thereby assure that said primary locking arm becomes fully engaged with said latching member, whereupon said camming end snaps beneath said keeper projection to indicate that said connector bodies have reached the fully mated position, said camming end also serving to capture said primary locking arm base, whereby a double lock between said connector bodies is cooperatively provided.

4,714,434

TERMINAL BLOCK WITH CIRCUIT MARKER

Alexander R. Norden, 350 Central Park West, New York, N.Y. 10025

Filed Feb. 6, 1986, Ser. No. 826,584
Int. Cl.[4] H01R 9/24
U.S. Cl. 439—488 **8 Claims**



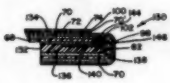
1. A multiple-circuit terminal block, including a series of connecting devices each of which has first and second wire fasteners, a support essentially of electrical insulation having opposite first and second sides and having a top extending side-to-side, and a circuit identification member, said connecting devices being carried by said support and being spaced apart from each other along the support, the first and second wire fasteners of each connecting device being spaced apart and being aligned with each other side-to-side on said support, said wire fasteners being disposed for manipulation by a tool from above said support, the first wire fasteners and the second wire fasteners of said connecting devices being distributed in a first row and in a second row, respectively, along said support, said circuit identification member and said support having mutually complementary guiding formations disposing the circuit identification member above the support and constraining said circuit identification member to slide side-to-side so as to overlie selectively each of said rows of fastening devices while exposing the other of said rows of wire fastening devices for manipulation, portions of said circuit identification member being aligned with said connecting devices, respectively, and having areas exposed to view for bearing circuit-identification marks whereby such circuit identification marks are and remain aligned with said connecting devices, respectively, as the circuit identification member is shifted side-to-side.

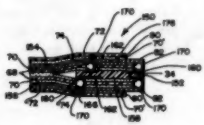
4,714,435

CONNECTION FOR FLEXIBLE APPARATUS

John M. Stipanuk, Glen Ellyn, and John M. Yun, Oak Brook, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Continuation of Ser. No. 798,191, Nov. 14, 1985, abandoned.
This application Mar. 5, 1987, Ser. No. 23,936
Int. Cl.[4] H01R 9/07
U.S. Cl. 439—496 **2 Claims**





1. In an edge card arrangement for electrically connecting conductors of a flat flexible circuit member to a second circuit member including

an edge card connector connected to said second circuit member including an elongated dielectric housing with an edge card socket defined therein and a plurality of terminals having one end adapted to electrically mate with the second circuit member and another end adapted to electrically mate with circuits in said flexible circuit member, and

a rigidized flexible circuit assembly adapted to be received in said edge card socket including a rigid carrier, a flexible circuit member including a first insulative layer and a plurality of exposed conductors disposed thereon, the flexible circuit member being bonded on said carrier so that the first insulative layer is disposed adjacent a carrier surface and the exposed conductors face away from the carrier, wherein the improvement comprises:

an in-line filtered interconnect including:

said carrier including a filter circuit having spaced apart first and second contact pads disposed on a major surface thereof;

at least one of said flexible circuit conductors overlying and aligned with said first and second contact pads and a portion of said conductor extending between said first and second contact pads being discontinuous;

means for electrically connecting said overlying conductor to the first and second contact pads; and

at least one of the terminals of the connector electrically engaged to the conductor,

whereby a signal travelling along the conductor is transmitted through electrical connecting means to said first contact pad, through the filter circuit to said second

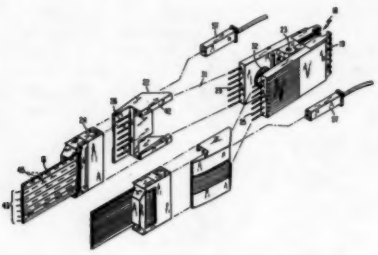
contact pad, through connecting means and emerges at the exposed conductor for engagement by the terminal.

4,714,436

TEST CLIP WITH GROUNDING ADAPTOR FOR CABLE CONNECTOR

Wayne R. Jones, Alderwood Manor, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Dec. 15, 1986, Ser. No. 942,533
Int. Cl.[4] H01R *4/66, 9/07*
U.S. Cl. 439—497 **18 Claims**



1. A connector for connecting a plurality of leads of a unit under test (UUT) to a testing apparatus through an interface cable, said connector, comprising:

a plurality of test conductors, each test conductor having a contact end for contacting a lead under test and a connector end for connecting to said cable;

first arm means for supporting said test conductors; and

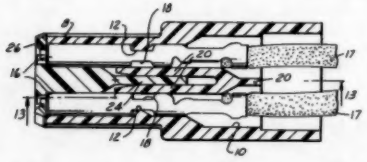
reference voltage pin adaptor means comprising a plurality of commonly bussed pins and means for attaching said adaptor means to said first arm means.

4,714,437

ELECTRICAL CONNECTOR

Joseph J. Dyki, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jan. 20, 1987, Ser. No. 5,066
Int. Cl.[4] H01R *13/40*
U.S. Cl. 439—595 **3 Claims**



1. A separable electrical connector comprising:

an elongated, rigid, nonconductive, generally tubular member substantially open at either end;

a plurality of apertures extending axially through said tubular member;

a plurality of outboard ramping retention abutments formed integrally with said tubular member upon at least one inner surface of a radially outboard portion of said tubular member so that each of said apertures has at least one of said abutments extending radially inward into said aperture;

a plurality of axially connectable cylindrical electrical terminals adapted for coupling to the ends of insulated wires, where each terminal has an annular external recess in its cylindrical peripheral surface, with one of said terminals seated in each of said apertures such that said annular external recess of each terminal is engaged with at least one of said outboard ramping retention abutments;

a central land located within said tubular member and defining a portion of each of said apertures with said central land comprising a plurality of axially extending terminal guide fingers cantilevered from a bulkhead extending transversely across the interior of said tubular member, with each of said fingers having a portion extending in juxtaposition to one of said ramping retention abutments; and

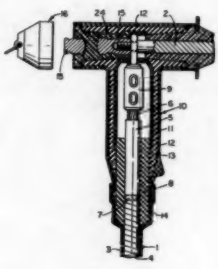
spacer means axially engaged with said central land for displacing said terminal guide fingers in the direction of said ramping retention abutments so that said ramping retention abutments will retain said terminals within said apertures, said spacer means comprising a unitary cover overlying an entire mating face on one of said ends of said tubular member and having a plurality of apertures extending therethrough for receiving a plurality of mating terminals, with at least one of said apertures corresponding to each of said apertures in said tubular member, said spacer means further comprising a plurality of blades cantilevered to said cover, with each of said blades interposed between two of said terminal guide fingers.

4,714,438

ELECTRIC CABLE JOINTS

Ronald D. Williams, St. Helens, England, assignor to BICC Public Limited Company, London, England

Filed Jun. 30, 1986, Ser. No. 880,030
Claims priority, application United Kingdom, Jul. 19, 1985, 8518256; Oct. 8, 1985, 8524781
Int. Cl.[4] H01R *13/53, 13/658*
U.S. Cl. 439—610 **6 Claims**



1. An electric cable joint comprising:

at least one cable end having at least one core, said cable end being cut back to expose respective ends of a central conductor, of dielectric material surrounding said conductor and of a dielectric screen surrounding said dielectric material;

at least one inner component in the form of a sleeve made of an insulating material heat-shrunk onto said core and extending across said end of the dielectric screen;

and at least one outer component of resilient material which is interference fit with said inner component.

4,714,439

ELECTRICAL CONNECTOR

Eduardo J. Marabotto, Miami; Mark S. Bresin, Coral Springs, both of Fla., and Bick R. Drake, Warren, Mich., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 3, 1986, Ser. No. 881,753
Int. Cl.[4] H01R *13/24, 13/52;* **H01M** *2/26, 10/38*
U.S. Cl. 439—627 **8 Claims**

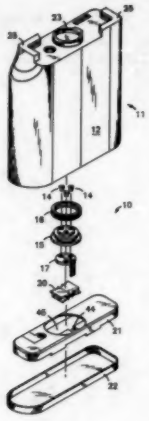
1. An electrical connector for providing electrical connection between a battery located in a compartment of a battery

housing, and a mating connector, said electrical connector comprising:

a body portion including a substantially cylindrical cavity, and adapted to be seated at one end of said compartment,

a plurality of electrical contacts,

a contact block located in said cavity and having a contact carrying surface with the plurality of said contacts extending from said surface,



a peripheral resilient seal about the contact block, the seal being seated in said cylindrical cavity for providing a water seal with said body portion while allowing both logitudinal and tilting movement of the contact block relative to said body portion, and

biasing means operatively engaging the contact block for applying a resilient biasing force to the contact block and the contacts for providing electrical connection of said contacts to said mating connector.

4,714,440

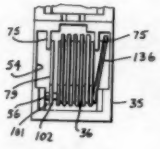
UNIVERSAL ADAPTER AND METHODS OF AND APPARATUS FOR MAKING SAME

Erie M. Hutchins, Bel Air, Md., assignor to American Telephone and Telegraph Company, AT&T Technologies, Inc., Berkeley Heights, N.J.

Filed Oct. 28, 1985, Ser. No. 792,086

Int. Cl.[4] H01R *23/02*

U.S. Cl. 439—676 **17 Claims**



1. A modular adapter having one end portion capable of being inserted into a jack cavity and another end portion capable of receiving modular plugs, said adapter comprising:

a housing having a plug end portion for receipt in a jack cavity and a jack end portion having first and second jack cavities, said first jack cavity being defined by a plurality of spaced partitions, a ceiling and portions depending from said ceiling and spaced apart a distance equal to a width of a locking tab of a plug destined to be received therein, each of the depending portions in said first cavity being spaced from an adjacent sidewall of the housing and disposed between an outermost one of the partitions and the adjacent sidewall; and

a plurality of metallic contact elements including a first group each of which extends from a retroflexed end portion thereof in the first jack cavity to said plug end portion and a second group each of which extends from the first jack cavity to the second jack cavity with each end of each contact element of said second group having a retroflexed configuration, the retroflexed end portion of at least one of said contact elements in said first cavity being disposed in a receiving space formed between one of the outermost partitions and an adjacent spaced sidewall of said housing and the retroflexed end portions of other ones of said contact elements in said first cavity being disposed between adjacent partitions.

4,714,441

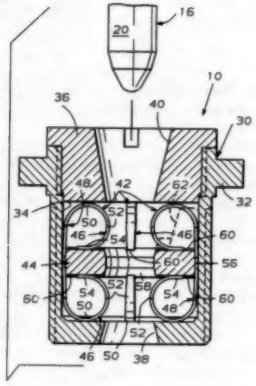
ELECTRICAL SOCKET

Ned E. Corman, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 29, 1987, Ser. No. 8,679

Int. Cl.[4] H01R *13/11*

U.S. Cl. 439—842 **10 Claims**



1. An electrical socket for receiving a pin, comprising

a housing means defining cavity means, first disc means disposed in said cavity means and having an opening therethrough; and

a plurality of contact means, each having a resilient, curved beam means on each end of a connecting strap means, said contact means positioned on and around said first disc means with said beam means on each contact means being on each side thereof, said beam means cooperating with adjacent beam means to define passages on each side of said disc means to resiliently receive the pin for electrical engagement therewith.

4,714,442

LOW PROFILE LEAD SOCKET

William B. Walkup, Barrington, Mass., assignor to Augat Inc., Mansfield, Mass.

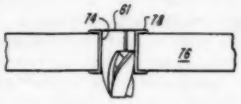
Filed Jan. 12, 1987, Ser. No. 2,101

Int. Cl.[4] H01R *13/11*

U.S. Cl. 439—844 **5 Claims**

1. A lead socket for insertion into a plated-through hole in a printed circuit board to receive a lead inserted therein comprising:

a conductive, generally cylindrical portion having a longitudinal axis and upper and lower openings;



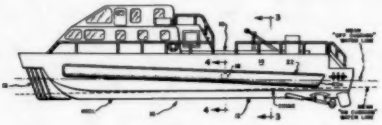
a plurality of conductive, compliant fingers each extended from the cylindrical portion and angled about the longitudinal axis in a generally conical helix configuration.

4,714,443

FLEXIBLE EXHAUST DUCT

John B. Chaplin, Edgewater, Md., and Charles S. Whipple, Slidell, La., assignors to Textron Inc., Providence, R.I.

Filed Aug. 20, 1986, Ser. No. 898,352
Int. Cl.[4] B63H *21/32*
U.S. Cl. 440—89 **6 Claims**



1. In a marine vessel having oppositely facing hull sides and powered by internal combustion engine means, the improvement comprising:

exhaust ducts connected to said engine means for conveying engine exhaust therefrom outwardly through openings provided in each of said hull sides; and

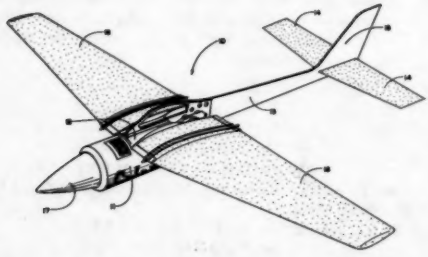
elongated exhaust conduits mounted on each of said hull sides in flow communication with said openings, said exhaust conduits extending substantially coextensive with said hull sides in a direction lengthwise of said vessel and having rearwardly opening nozzles for directing said engine exhaust from said engine means rearwardly of said vessel, and said exhaust conduits are arranged and formed of a flexible and inflatable material inflatable in response to the pressures of said engine exhaust to provide deformable pneumatic cushion-like bumpers for protecting said hull sides.

4,714,444

DRINK CAN GLIDER

Robert D. Rendel, Rte. #1, Box 826, Laurinburg, N.C. 28352

Filed May 12, 1986, Ser. No. 862,265
Int. Cl.[4] A63H *27/18*
U.S. Cl. 446—61 **13 Claims**



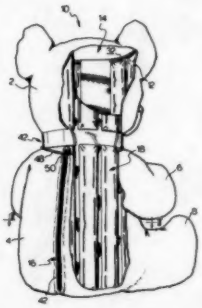
1. an improved aircraft comprising: a wing saddle means; wing means; means for releasably securing said saddle means to said wing means; tail means; means for releasably securing said tail means to said saddle means; and means for releasably mounting at least one can-type means to said saddle means whereby an improved aircraft utilizing at least one can as a fuselage is provided.

4,714,445

WARMED ANIMAL TOY

Charles B. Templeton, 701 Don Mills Rd. #2600, Toronto, Canada M3C-1R9

Filed Sep. 22, 1986, Ser. No. 909,587
Claims priority, application Canada, Sep. 27, 1985, 491772
Int. Cl.[4] A61F *7/08*
U.S. Cl. 446—74 **22 Claims**



1. A soft, lightweight toy comprising:

flexible, heat-transmitting cover means defining an enclosed recess therein,

flexible bladder means removably received in the recess,

the bladder means having an outer wall and an inner wall and retaining therebetween a first material having a high density, high specific heat and high thermal conductivity,

the outer wall located adjacent inside surfaces of the cover means,

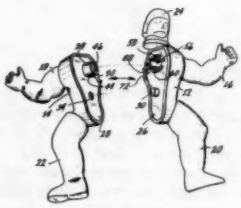
the inner and outer walls spaced relatively small distances apart so that the bladder means provides a relatively thin layer of said first material underlying the cover means over substantial portions of inside surfaces of the cover means yet with the layer of said first material having sufficient thickness to provide a substantial heat reservoir or sink.

4,714,446

TOY FIGURE WITH EXPANDABLE LATCH

Sam Y. Lee, Los Angeles, Calif., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Sep. 16, 1986, Ser. No. 908,127
Int. Cl.[4] A63H *11/06*
U.S. Cl. 446—311 **5 Claims**



1. A toy figure comprising:

a first torso half;

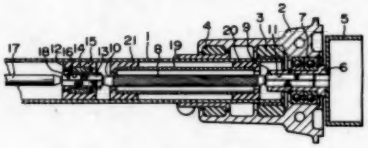
a second torso half releasably coupled to said first torso half;
expandable latch means for releasably holding said first and second torso halves together;
spring means within one of said first and second torso halves for biasing said torso halves apart; and
cable means releasably coupled to said first and second torso halves for expanding said expandable latch means in order to allow said spring means to separate said torso halves.

4,714,447

POWER TRAIN OF MOWING MACHINE

Yoshiaki Hironaka, Yokohama, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Continuation of Ser. No. 701,237, Feb. 13, 1985, abandoned. This application Apr. 8, 1986, Ser. No. 850,445
Claims priority, application Japan, Feb. 14, 1984, 59-19585[U]
Int. Cl.⁴ F16C *1/06*
U.S. Cl. 464—52 **1 Claim**



1. A power train of a mowing machine comprising:
a relatively short flexible shaft connected at one end thereof to an output shaft of a prime mover connected to a rear end of a hollow straight operating rod, said flexible shaft extending axially through said operating rod;
a joint member of cylindrical configuration rotatably journalled by a bearing mounted to an inner surface of the operating rod near the rear end thereof through a vibration damping member, said joint member being connected to an opposite end of said flexible shaft;
a relatively long rigid transmission shaft connected at one end thereof to said joint member, said rigid transmission shaft extending through said operating rod and connected at an opposite end thereof to a cutter blade device connected to a forward end of the operating rod; and
a sleeve member mounted to an inner surface of said operating rod through a vibration damping member, said sleeve member being located around said flexible shaft.

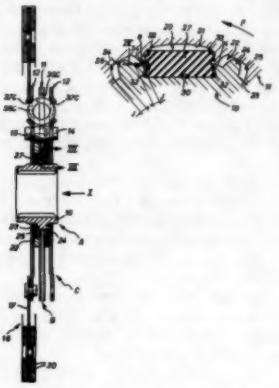
4,714,448

TORSIONAL DAMPER DEVICE

Hervé Focqueur, Franconville, and Bernard Jumel, Pierrefitte, both of France, assignors to Valeo, Paris, France

Filed Dec. 26, 1985, Ser. No. 813,678
Claims priority, application France, Dec. 27, 1984, 84 19877
Int. Cl.⁴ F16D *3/12*
U.S. Cl. 464—68 **15 Claims**

1. Torsional damper device for an automotive vehicle clutch, wherein at least two coaxial parts are mounted to rotate relative to each other against circumferentially acting elastic means disposed therebetween within limits of relative angular movement determined by meshing means with clearance provided between the coaxial parts in cooperation with centering means adapted to urge the coaxial parts in the circumferential direction towards an intermediate rest position between the limits of relative angular movement, the centering means at least one elastic member constituting part of the circumferentially acting elastic means colocated with the meshing means with clearance of the coaxial parts and adapted, for the rest position of the latter, to bear at each circumferential end against shoulders of the coaxial parts which are oblique to each other as the flanks of a dovetail groove, at least one of said shoulders terminating in a sharp edge, the elastic member comprising a simple circumferentially elongated block of elastic material which is disposed chordally of the damper device, the circumferential ends of the elastic member being free of any covering and adapted to bear directly against the corresponding shoulders of the coxial parts between which said elastic member is circumferentially disposed, and an axial



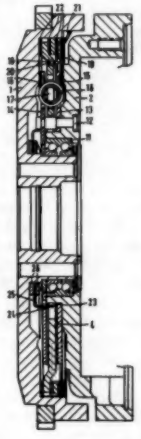
recess being disposed in the one of said circumferential ends of the elastic member facing said sharp edge for receiving the sharp edge so as to avoid contact between the sharp edge and the elastic member in the course of operation.

4,714,449

APPARATUS FOR REDUCING VEHICLE DRIVE TRAIN VIBRATIONS

Guenter Woerner, Kernen; Ernst Tscheplak, Weinstadt, and Franz Moser, Wendlingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Jun. 4, 1986, Ser. No. 870,346
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3519912
Int. Cl.⁴ F16D *13/60*; F16F *15/12*
U.S. Cl. 464—68 **10 Claims**



1. Apparatus for reducing the transmission of vibrations from an engine to a transmission line, comprising:
a divided flywheel having first and second flywheel elements, one said element being drivingly connected to said

engine and the other said element being drivingly connected to said transmission line;

spring mounting means for drivingly coupling said first and second flywheel elements;

first abutment means connected to said first flywheel element for abutting said spring mounting means;

second abutment means connected to said second flywheel element for abutting said spring mounting means;

first slip clutch means for providing a first frictional connection between said first abutment means and said first flywheel element, said first slip clutch means permitting relative rotation between said flywheel elements in response to forces above a first predetermined threshold level;

second slip clutch means for providing a second frictional connection between said first abutment means and said first flywheel element, said second slip clutch means frictionally connecting said flywheel elements only after a threshold relative displacement between said flywheel elements is exceeded;

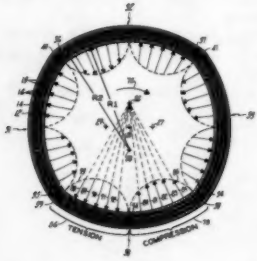
wherein said first frictional connection is below a maximum torque of said engine and a sum of said first and second frictional connections is greater than said maximum torque of said engine.

4,714,450

ELASTOMERIC HIGH TORQUE, CONSTANT VELOCITY JOINT

Francis E. Byrnes, White Plains, N.Y.; Donald L. Ferris, Newtown, Conn.; Edward S. Hibyan; William L. Noehren, both of Trumbull, Conn., and Peter C. Ogle, Woodbridge, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 622,809, Jun. 20, 1984, abandoned.
This application Nov. 14, 1986, Ser. No. 931,002
Int. Cl.[4] B64C *27/35;* **F16C** *27/06;* **F16D** *3/76*
U.S. Cl. 464—90 **6 Claims**



1. A constant velocity joint comprising:

an inner shell having an exterior surface having a first contour defined by an axis, at least three arc segment generating points equally offset from the axis and symmetrically distributed thereabout on a plane which is normal to the axis, and a first radius from each of the at least three arc segment generating points, each first radius defining an arc segment of said first contour, said first contour having a nearly spherical axial profile with polar symmetry;

an outer shell disposed about the inner shell and having an interior surface having a second contour defined by the axis, the at least three arc segment generating points, and a second radius larger than the first radius from each of the at least three arc segment generating points, each second radius defining an arc segment of said second contour, said second contour having a nearly spherical axial profile with polar symmetry; and

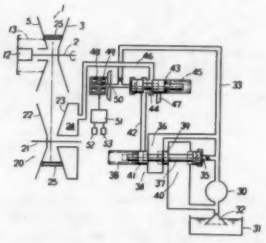
at least one elastomeric layer disposed between the exterior surface of the inner shell and the interior surface of the outer shell, said at least one elastomeric layer being bonded on the respective exterior surface of the inner shell and interior surface of the outer shell and being precompressed therebetween such that rotation of the inner shell relative to the outer shell about said axis causes the at least one elastomeric layer to bend in contiguous regions of compression and tension normal to said at least one elastomeric layer along each arc segment to transmit a torque between the inner and outer shell.

4,714,451

V BELT STEPLESS VARIABLE TRANSMISSION

Ryo Yoshida, and Hiroshi Aikawa, both of Ikeda, Japan, assignors to Daihatsu Motor Company Limited, Osaka, Japan

Filed Jun. 24, 1985, Ser. No. 748,401
Claims priority, application Japan, Jun. 23, 1984, 59-129478
Int. Cl.[4] F16H *9/04*
U.S. Cl. 474—28 **6 Claims**



1. A V belt stepless variable transmission comprising: a driving pulley connected with a drive shaft, a stationary conical disc fixed thereto, and a movable conical disc movable with respect to said drive shaft; a driven pulley connected with a driven shaft, a stationary conical disc fixed thereto, and a movable conical disc axially movable with respect to said driven shaft; and an endless V belt running across both said pulleys,

said driving pulleys being provided with a tension adjusting means disposed between said driving shaft and said movable conical disc at said driving pulley so as to mechanically apply to said movable conical disc thrust corresponding to input torque to thereby adjust tension on said V belt,

said tension adjusting means having a cam with a cam face and axially slidable with respect to said drive shaft and rotatable, and a contact member contactable with said cam face so as to rotate integrally with said drive shaft to thereby give thrust to said cam, said cam being fixed to said movable conical disc at said driving pulley,

said driven pulley having a hydraulic actuating cylinder for axially shifting said movable conical disc at said driven pulley, and

said variable transmission being provided with a pulley ratio control means for supplying and discharging fluid to and from said hydraulic actuating cylinder so as to actuate said movable conical disc at said driven pulley, thereby controlling the pulley ratio.

4,714,452

ORIENTED FLAT BELT CONTINUOUSLY VARIABLE TRANSMISSION USING PULLEYS WITH GUIDEWAYS

Emerson L. Kumm, 1035 E. Laguna Dr., Tempe, Ariz. 85282, and Theodore C. Kraver, 225 W. Orchid La., Phoenix, Ariz. 85021

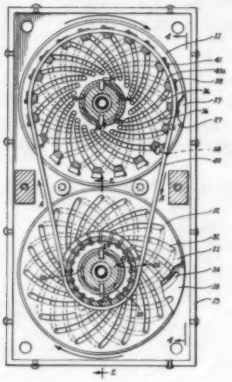
Filed Jun. 6, 1986, Ser. No. 871,254
Int. Cl.[4] F16H *11/02, 55/54*
U.S. Cl. 474—49 **4 Claims**

1. A belt drive system comprising a driving pulley and a driven pulley, a belt extending around said pulleys, each of said

driving and said driven pulleys including a first pair of inner pulley disks having logarithmic spiral guideways of one sense formed therein and mounted for rotation as a unit on a shaft and fixed to said shaft and a second pair of outer pulley disks having logarithmic spiral guideways of an opposing sense formed therein and mounted for rotation as a unit on said shaft but having limited circular movement relative to said first pair of pulley disks,

one of said second pair of pulley disks being disposed adjacent but exterior to one of said first pair of pulley disks and the other one of said second pair of pulley disks being disposed adjacent but exterior to the other one of said first pair of pulley disks,

the logarithmic spiral guideways of said one of said first pair of pulley disks and the logarithmic spiral guideways of said one of said second pair of pulley disks forming first intersections,



the logarithmic spiral guideways of said other one of said first pair of pulley disks and the logarithmic spiral guideways of said other one of said second pair of pulley disks forming second intersections, belt drive elements extending between respective ones of said first and said second intersections,

said belt extending around the belt drive elements of said driving pulley and the belt drive elements of said driven pulley, and having a designated direction of rotation,

the sense of said logarithmic spiral guideways of said first pair of inner pulley disks of said driving pulley being opposed to said designated direction of rotation,

the sense of said logarithmic spiral guideways of said first pair of inner pulley disks of said driven pulley being the same as said designated direction of rotation,

and means associated with said second pair of outer pulley disks of each of said driving and driven pulleys for rotating said second pair of outer pulley disks relative to said first pair of inner pulley disks.

4,714,453

DRIVE CHAIN ADJUSTMENT MECHANISM FOR VEHICLES HAVING TWO REAR WHEELS

Shinji Takayanagi, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 22, 1986, Ser. No. 865,691

Claims priority, application Japan, May 23, 1985, 60-76850[U]

Int. Cl.[4] F16H *7/10*

U.S. Cl. 474—112 **2 Claims**

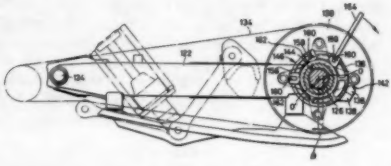
1. A drive chain adjustment mechanism for vehicle having two rear wheels, which includes:

a swing arm pivotally mounted at its front end on a body frame;

a pipe member fixed to the rear end of said swing arm;

a holder member having therethrough an eccentric bore, said holder member being inserted into and clamped and fixed with said pipe member, and being rotatably supported in place during chain adjustment;

an axle for the rear wheels, rotatably inserted into said eccentric bore in said holder member; and



a driven sprocket mounted between one end of said holder member and one of said two rear wheels and fitted over said axle, said holder member being provided at said one end with a plurality of projections having recessions to receive a tool for turning said holder member, each said recession opening through the extremem end and on one side of its respective projection.

4,714,454

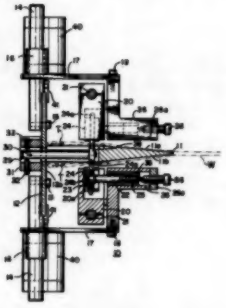
APPARATUS FOR PRODUCING MACHINE-DIRECTION HEAT SEALS

Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 8, 1986, Ser. No. 904,445

Int. Cl.[4] B31B *23/64, 23/86*

U.S. Cl. 493—193 **6 Claims**



1. In a machine for making draw tape bags having front and back panels from thermoplastic film wherein the opposing panels of a moving web of folded film have each of their edges opposite the fold folded over to form a hem comprising two opposing layers of film in each edge to provide a pair of opposing hems for receiving the draw tape, apparatus for heat sealing the respective layers of film in the pair of hems in the moving web of the film comprising:

structure including a member having a pair of spaced surfaces over which pass the two layers of film of each hem of the pair of hems,

a first block supported by said structure with respect to one of said surfaces and on one side of one hem of the pair of hems,

a plurality of rollers mounted on said first block at spaced locations in tandem in the direction of web movement for engaging the outermost layer of film in said one of the hems along a path in the direction of web movement,

a second block supported by said structure with respect to the other one of the said surfaces and on one side of a

second hem of the pair of hems, said second block having a plurality of rollers mounted thereon in spaced locations in tandem in the direction of web movement for engaging the outermost layer of film in said second hem along a path in the direction of web movement,

means supported by said structure between the pair of hems for engaging the other layer of the film in each of the hems and cooperating with said rollers on said blocks, and

means for heating each of said blocks and the respective plurality of rollers, each said plurality of rollers being heated and freely rotatable whereby mnovement of the hems through the heat sealing apparatus causes each said plurality of heated rollers mounted on said blocks to rotate and produce the heat seals in the pair of hems.

4,714,455

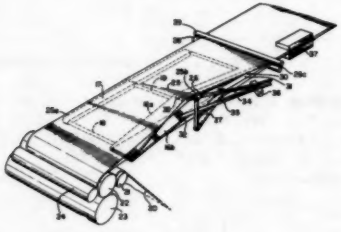
HEM FOLDER WITH INTEGRAL TAPE INSERTER FOR MAKING DRAW TAPE BAGS

Fox J. Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 6, 1986, Ser. No. 871,238

Int. Cl.[4] B31B *1/90*

U.S. Cl. 493—225 **12 Claims**



1. A machine for making draw tape bags from a moving web of folded thermoplastic film having two folded faces, each having an edge comprising:

two spaced folding surfaces each having a width, over which said web impinges on said surfaces, wider than the final bag length, said surfaces decreasing in width to said final bag length to control said final bag length, one folded face of said web passing over one side of each of said surfaces;

means for tucking each edge of said web between said surfaces onto the other side of each surface to produce a hem in each edge of said web so that said web is at the final length of said bag upon leaving said surfaces;

slot in said surfaces in the area of said decreasing width; and

means for feeding a tape through said slots into the hems of said moving web.

4,714,456

SOLID BOWL CENTRIFUGE WITH TERMINAL CLARIFICATION DEVICE

Wolfgang Bender; Dieter Mrotzek, both of Burscheid; Bernd Koglin, Bergisch Gladbach, and Karl-Heinz Steiner, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

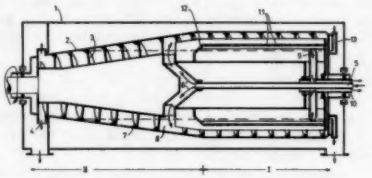
Filed May 7, 1986, Ser. No. 860,713

Claims priority, application Fed. Rep. of Germany, May 25, 1985, 3518885

Int. Cl.[4] B04B *7/16*

U.S. Cl. 494—36 **5 Claims**

1. In a solid bowl screw centrifuge having a cylindrical clarifying part, a conical demoisturizing part, a screw, means mounting the screw in the two parts for rotation, a suspension inflow opening into the end of the clarifying part between the clarifying part and the demoisturizing part, a liquid discharge including an overflow weir or a stripping pipe on the clarifying part and a solids discharge on the demoisturizing part, the improvement wherein the means mounting the screw in the cylindrical clarifying part comprises a cylindrical hollow



screw core having a peripheral surface at least partly comprising an after-clarifying device through which fluid flows in a radial direction, and wherein the liquid discharge is situated within the after-clarifying device.

4,714,457

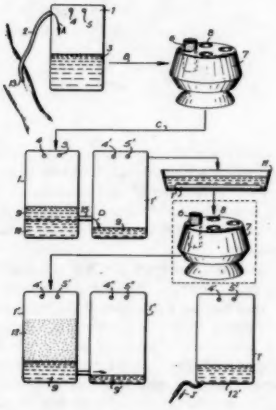
METHOD AND APPARATUS FOR USE IN PREPARATION OF FIBRINOGEN FROM A PATIENT'S BLOOD

Robert Alterbaum, 101 West 15th St., New York, N.Y. 10011

Filed Sep. 15, 1986, Ser. No. 906,894

Int. Cl.[4] B04B *5/02;* **B01D** *43/00*

U.S. Cl. 494—37 **8 Claims**



1. A method for use in the autologous preparation of fibrin glue wherein a patient's blood is separated in a centrifuge having cylindral cups pivotally mounted to a rotor to obtain plasma and wherein the plasma is separated in the centrifuge to produce concentrated fibrinogen, comprising the steps of:

(A) transferring the blood or plasma into a substantially flat packet;

(B) fixing the packet containing the blood or plasma in a recess of a substantially cylindrical insert fixture assembly;

(C) inserting said cylindrical-shaped insert fixture assembly in a cup of the centrifuge having a complementary cylindrical shape so that the insert fixture assembly is held snugly within said centrifuge cup;

(D) centrifuging the blood or plasma contained within said packet fixed in said insert fixture assembly held in said centrifuge cup to separate the blood or plasma into components; and

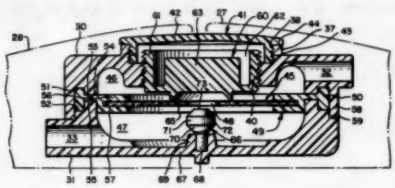
(E) forming fibrin glue from one of said separated components.

4,714,458

THREE STAGE VALVE WITH FLEXIBLE VALVE SEAT

Michael D. Hooven, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Dec. 23, 1985, Ser. No. 812,771
Int. Cl.[4] A61M 27/00
U.S. Cl. 604—9 7 Claims



1. A valve for regulating the flow of fluid from one location in the body to another location, comprising:

a bio-compatible housing;

a flexible one-piece bio-compatible diaphragm dividing the interior of said housing into first and second interior chambers, said diaphragm including an integral valve seat portion defining a fluid passageway opening from said first interior chamber to said second interior chamber, and defining a first valving surface concentrically oriented with respect to the axis of said fluid passageway, said valve seat portion having a static position within said housing in the absence of a pressure differential between said chambers;

inlet port means for establishing fluid communication between said first interior chamber and the one location;

outlet port means for establishing fluid communication between said second interior chamber and the other location;

means comprising an elongated bio-compatible valve stem member attached at one end to said housing primarily within said second chamber and extending therefrom along the axis of said fluid passageway toward said first chamber, said valve stem member defining a plurality of additional valving surfaces for coacting with said first valving surface to form a flow restriction within said passageway between said first and second chambers;

said additional valving surfaces including, progressing from said first chamber toward said second chamber, a first surface of generally relatively lesser radial extent from said axis for providing a relatively lesser flow restriction in said passageway, a second surface of generally relatively greater radial extent for providing a relatively greater flow restriction in said passageway and a third surface of generally lesser radial extent similar to said first surface to provide a relatively lesser flow restriction in said passageway;

valve closure means coacting with said valve seat portion in said static position to close said passageway to provide a first valving mode wherein flow between said first and second interior chambers is prevented; and

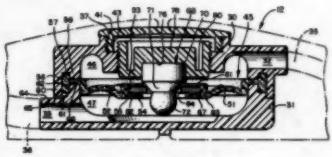
said valve seat portion being displaceable from said static position in a direction along said axis of said fluid passageway away from said valve closure member in response to an increase in pressure differential between said first interior chamber and said second interior chamber to cause said first valving surface to successively coact with said first, second and third surfaces of said valve stem member thereby providing second, third and fourth valving modes, in said second valving mode fluid flow occurring between said interior chambers so as to maintain a first substantially constant predetermined pressure in said first chamber, in said third valving mode fluid flow remaining substantially constant between said chambers notwithstanding changes in differential pressure, and in said fourth valving mode fluid flow occurring between said chambers to maintain a second substantially constant predetermined pressure in said first interior chamber.

4,714,459

THREE STAGE INTRACRANIAL PRESSURE CONTROL VALVE

Michael D. Hooven, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Dec. 23, 1985, Ser. No. 812,779
Int. Cl.[4] A61M 27/00
U.S. Cl. 604—9 2 Claims



1. A subcutaneous implantable valve for regulating the flow of body fluids from one location in the body to another location, comprising:

a housing having first and second interior chambers;

inlet port means for establishing fluid communication between said first chamber and the one location;

outlet port means for establishing fluid communication between said second chamber and the other location;

a flexible diaphragm in said housing and dividing the same into said first and second chambers, said diaphragm being moveable in response to pressure differentials established between said first and second chambers;

a relatively rigid valve seat mounted on said diagphragm for movement therewith, said valve seat being disc-shaped and centrally thereof defining an annular fluid flow passageway having an interior wall which is flat in an axial direction and which extends in the direction of fluid flow between said first and second chambers, said interior wall defining a first valving surface; and

a one-piece valve stem of over-all generally cylindrical configuration mounted on said housing and projecting into said first interior chamber toward said second chamber and in coaxial alignment with said fluid flow passageway, said valve stem in the direction of fluid flow consisting of a cylindrical upper mounting portion of relatively substantial axial extent and having a relatively large diameter, said mounting portion having a substantial part thereof fixed in said housing to mount said valve stem thereon, said mounting portion in the direction of fluid flow merging with a first frusto-conical portion of decreasing diameter defining a second valving surface for engagement with said valve seat to establish a first condition of fluid flow whereby in the absence of fluid pressure differential fluid flow between said first and second chambers is prevented, said first portion in the direction of fluid flow merging with a second generally frusto-conical portion of increasing diameter defining a third valving surface cooperating with said second valving surface to coact with said first valving surface to establish a second condition of fluid flow wherein a first substantially constant predetermined pressure is maintained in said first chamber, and said second portion in the direction of fluid flow merging with a third generally spherical portion defining a fourth valving surface of progressively decreasing diameter cooperating with said third valving surface to coact with said first valving surface to establish a third condition of fluid flow wherein a substantially constant rate of fluid flow from said first chamber into said second chamber is maintained, said fourth valving surface further coacting with said first valving surface to establish a fourth condition of fluid flow wherein a second substantially constant

predetermined pressure is maintained in said first chamber.

4,714,460

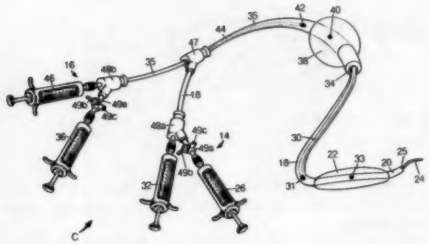
METHODS AND SYSTEMS FOR RETROGRADE PERFUSION IN THE BODY FOR CURING IT OF THE DISEASE OR IMMUME DEFICIENCY

Reynaldo Calderon, 1202 Harvard, Houston, Tex. 77008

Continuation of Ser. No. 518,685, Jul. 29, 1983, abandoned. This application Jun. 6, 1986, Ser. No. 871,528

Int. Cl.[4] A61B *1/06*

U.S. Cl. 604—28 **12 Claims**



1. A method for treating a tumor in the body of a patient, comprising the steps of:

(a) placing a catheter having a suction lumen and an infusion lumen extending beyond the suction lumen and a seal associated with each of such lumens in a vein of the patient near the tumor;

(b) sealing the flow of fluid in the patient's vein between the infusion lumen and the suction lumen with the infusion seal;

(c) sealing the flow of fluid in the patient's vein past the suction lumen with the suction seal;

(d) injecting a chemotherapeutic agent from the infusion lumen into the patient's vein so that it may perfuse through the tumor; and

(e) collecting the chemotherapeutic agent in the suction lumen after perfusion through the tumor.

4,714,461

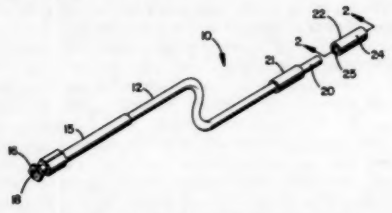
CATHETER ASSEMBLY WITH AIR PURGING FEATURE

Jonathan B. Gabel, Bloomfield, N.J., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Nov. 7, 1985, Ser. No. 795,819

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—53 **1 Claim**



1. A method for using a liquid-filled catheter for a desired activity in a body passage, said catheter having a tube with a normally closed distal end and with a liquid-receiving lumen, the method comprising the steps of:

creating a temporary fluid path between a lumen of a flexible tube via the distal end thereof and the environment outside of the catheter;

introducing liquid into said lumen so that said liquid travels toward said fluid path;

purging air from said lumen through said fluid path via the distal end of said tube as the liquid travels toward said fluid path;

closing said temporary fluid path subsequent to the purging of air from said lumen whereby the catheter retains the liquid inside said lumen;

inserting the distal end of said liquid-filled catheter into a body passage; and

performing the desired activity in the body passage with said liquid-filled catheter.

4,714,462

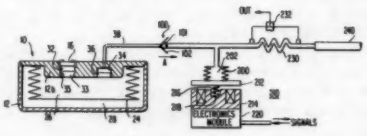
POSITIVE PRESSURE PROGRAMMABLE INFUSION PUMP

Robert A. DiDomenico, Norfolk, Mass., assignor to Intermedics Infusaid, Inc., Norwood, Mass.

Filed Feb. 3, 1986, Ser. No. 824,986

Int. Cl.[4] A61M *5/14*

U.S. Cl. 604—67 **23 Claims**



1. An infusion system for implantation in a living body comprising;

a fluid reservoir maintaining a liquid for delivery to an infusion site under positive pressure with respect to body pressure at said infusion site;

a drug pressurant chamber receiving fluid from said fluid reservoir;

a positive displacement pump to vary the volume of said drug pressurant chamber and thereby either fill said chamber by increasing its volume or pressurize said chamber to expel fluid from said chamber by reducing its volume;

valve means interposed between said reservoir and said chamber to prevent backflow of said fluid into said reservoir;

flow restriction means between said chamber and said infusion site;

means to control actuation of said positive displacement pump comprising;

programmed means to couple said source of power to said solenoid and thereby regulate the flow of fluid to said infusion site in accordance with a predetermined fluid delivery rate, and

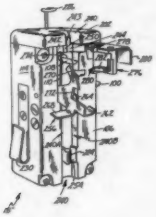
an external programmer programmed for varying actuation of said positive displacement pump, said programmer comprising;

a processor input means to provide instructions to said processor, memory means for storing data from said processor indicative of actuation rates for said positive displacement pump, means to transfer said data to said programmed means, a real time clock for providing a time input to said processor, a program memory and a non-volatile memory, and wherein said means to transfer data comprises a receiver/transmitter to establish a communication link with said programmed means.

4,714,463
SEQUENCE VALVE FOR PIGGYBACK IV ADMINISTRATION WITH TUBE REVERSAL PREVENTION

G. Kent Archibald, White Bear Lake, and Frank A. Slaker, New Brighton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation-in-part of Ser. No. 676,020, Nov. 29, 1984, Pat. No. 4,673,389. This application Nov. 15, 1985, Ser. No. 798,331
Int. Cl.[4] A61M 5/14
U.S. Cl. 604—81 19 Claims

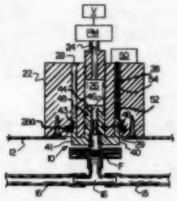


12. An IV administration system comprising:
a first source of a first IV fluid;
a second source of a second IV fluid;
an IV control device having an inlet and an outlet for delivering IV fluids;
a first flexible tube connected between the first source and the inlet;
a second flexible tube connected between the second source and the inlet;
a sequence valve positioned between the first and second sources and the inlet for selectively occluding the first and second flexible tubes in sequence, the sequence valve comprising:
a base having channel means for receiving the first and second flexible tubes;
crank means pivotally connected to the base for movment about a first pivot axis along a first path between first and second crank positions;
bias means for providing a bias force to the crank means which urges the crank means toward the second crank position;
occluder means connected to a first end of the crank means for occluding the first flexible tube when the crank means is in the first crank position, and for occluding the second flexible tube when the crank means is in the second crank position;
releasable latch means connected to the base for latching the crank means in the first crank position and for releasing the crank means in response to a control signal to allow the bias force to pivot the crank means to the second crank position;
tube retainer means connected to the base for pivoting about a second axis along a second path between an open position in which tubes can be inserted into or removed from the channel and a closed position which holds the tubes in the channel means; and
gate means for pivoting about a third axis along a third path between an open position in which the first tube can be inserted into or removed from the channel means, and a closed position which holds the first tube in the channel means where the first, second and third axes are positioned so that at least two of the first, second and third paths intersect, wherein the gate means includes means for preventing the tube retainer means from moving along the second path to its closed position unless the gate means is in its closed position; and
means for providing the control signal to the sequence valve.

4,714,464
MECHANISM FOR COUPLING THE ASPIRANT LINE OF AN IRRIGATION/ASPIRATION MACHINE TO THE PRESSURE MONITORING SECTION

Walter A. Newton, Lenoir, N.C., assignor to Entravision, Inc., Lenoir, N.C.

Filed Oct. 27, 1986, Ser. No. 923,277
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—118 8 Claims

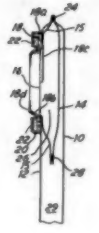


1. A safety machanism for irrigation/aspiration machines of the type which include a peristaltic pump producing a vacuum in an aspirant line and which machines include a vacuum monitoring section for sampling the pressure in said aspirant line, said safety mechanism comprising:
(a) a receptacle on said machine having a passageway through which said air samples pass and having an arming switch with "on" and "off" positions, said peristaltic pump being armed responsive to the activation of said arming swtich;
(b) a coupling means seatable in said receptacle in sealed relationship thereto for connecting said aspirant line to said vacuum monitoring section;
(c) said coupling means further including a means for activating said arming switch when said coupling is fully seated on said receptacle in said sealed relationship;
whereby, upon improper seating of said coupling means, said arming switch is deactivated and said pump is deactivated.

4,714,465
UROSTOMY APPLIANCE

Peter L. Steer, Surrey, England, assignor to Craig Medical Products Ltd., Sussex, England

Continuation of Ser. No. 633,725, Jul. 23, 1984, abandoned. This application May 12, 1986, Ser. No. 863,817
Claims priority, application United Kingdom, Aug. 22, 1983, 8322544
Int. Cl.[4] A61F 5/44
U.S. Cl. 604—340 2 Claims



1. A one-piece urostomy appliance comprising a drainage bag secured to one side of an apertured flange which is in turn secured on its body side opposite the urostomy appliance to an apertured adhesive pad for securing the appliance to the body of the user, the body side of the apertured flange being provided with a flexible skirt encircling the stoma aperture and located adjacent the radially inner boundary of the adhesive

pad, the flexible skirt extending from the rim of the flange aperture through the aperture in the adhesive pad towards the body of the wearer and extending beyond the skin-contacting surface of the adhesive pad on the body side of the pad, the rim of the flexible skirt adapted to make sealing contact with the skin of the body of the wearer spaced apart from and around the stoma to impede leakage of urine towards the inner boundary of the adhesive pad and the surface of the skin of the wearer, said apertured flange further comprising a substantially semi-circular arcuate rib or hood which extends into the bag and is positioned to keep a front or inner wall of the bag away from the stoma of the wearer.

4,714,466

ABSORBENT MEMBER FOR TAMPON

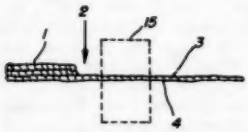
Masatake Dohzono; Iwao Miyashita, and Norihiro Abe, all of Utsunomiya, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jan. 7, 1986, Ser. No. 816,860

Claims priority, application Japan, Jan. 25, 1985, 60-12244; Jan. 25, 1985, 60-12247

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—378 **8 Claims**



1. An absorbent member having a front part and a rear part which comprises a first portion on the front part and a second portion on the rear part, said first portion having a smaller fiber density than the second portion wherein said density increases along the longitudinal direction of said member.

4,714,467

REINFORCED FIBER BONE REPLACEMENT IMPLANT HAVING TREATED SURFACES AND A METHOD FOR ITS MANUFACTURE

Fritz Lechner, Garmisch-Partenkirchen; Herbert Heissler, Munich; Wolfgang Scheer, Holzkirchen; Wolfgang Siebels, Munich, and Rudolf Ascherl, Garmisch-Partenkirchen, all of Fed. Rep. of Germany, assignors to M A N Technologie GmbH, Munich, Fed. Rep. of Germany

Filed Mar. 25, 1986, Ser. No. 843,733

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1985, 3511779; Jul. 5, 1985, 3524020

Int. Cl.[4] A61F *2/36;* **B29C** *67/14;* **B65H** *81/00*

U.S. Cl. 623—16 **9 Claims**

1. A bone replacement implant comprising a resin body having embedded within it reinforcement fibers, the surface of the body being roughened, and ends of at least some of the reinforcement fibers being exposed on the surface of the body.

4,714,468

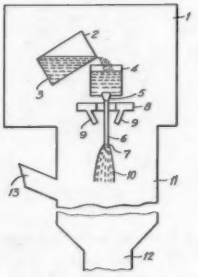
PROSTHESIS FORMED FROM DISPERSION STRENGTHENED COBALT-CHROMIUM-MOLYBDENUM ALLOY PRODUCED BY GAS ATOMIZATION

Kathy K. Wang, Suffern, N.Y.; Larry J. Gustavson, Dover, and John H. Dumbleton, Ridgewood, both of N.J., assignors to Pfizer Hospital Products Group Inc., New York, N.Y.

Division of Ser. No. 765,298, Aug. 13, 1985. This application Jan. 27, 1987, Ser. No. 7,064

Int. Cl.[4] B22F *1/00;* **C22C** *19/07, 29/12*

U.S. Cl. 623—16 **6 Claims**



1. A prosthesis made by forging a high-strength, corrosion-resistant, high temperature stable, ductile alloy having homogeneously distributed dispersed oxides and fine, equiaxed grain structure after high temperature exposure, said alloy being produced by gas atomisation and consisting essentially of the following percentage composition by weight:

chromium	26 to 30
molybdenum	5 to 7
manganese	0 to 1
silicon	0 to 1
iron	0 to 0.75
nickel	0 to 1.0
carbon	0 to 0.35
nitrogen	0 to 0.25
oxygen	0.003 to 0.20
oxide-forming metal	0.003 to 2.0

and the balance cobalt, apart from trace amounts of incidental impurities; in which the oxide-forming metal is a metal selected from the group consisting of magnesium, calcium, aluminum, yttrium, lanthanum, titanium and zirconium, which forms high temprature-stable, non-accretive, fine oxide particles which oxide has a free energy of formation greater than the oxide of the matrix metal and is homogeneously distributed in the dispersed phase; and said alloy after fabrication by gas atomization, thermomechanical processing and further high temperature exposure has an ultimate tensile strength of 160–200 k.s.i., a 0.2% offset yield strength of 75–100 k.s.i., an elongation of 37 to 60%, and a fatigue strength at 10^7 cycles of 70–95 k.s.i.

4,714,469

SPINAL IMPLANT

Robert V. Kenna, Hobe Sound, Fla., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.

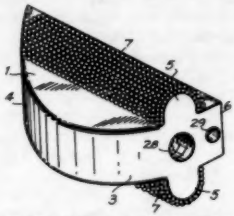
Filed Feb. 26, 1987, Ser. No. 19,283

Int. Cl.[4] A61F *2/44, 5/04;* **A61B** *17/00*

U.S. Cl. 623—17 **9 Claims**

1. A spinal implant comprising a rigid solid body having a first surface, a second surface and a third surface of predetermined thickness between and perpendicular to said first and second surfaces, each of said first and second surfaces being defined by a substantially D-shaped profile the curved portion

of which conforms to the outer profile of the vertebrae between which the implant is adapted to be implanted, said predetermined thickness being chosen to correspond to the space between said vertebrae, each of said first and second surfaces



having an elongated protuberance of substantially semi-circular cross-section extending the full width of the surface parallel to the straight side of the D, and at least a portion of each first and second surface having a porous coating thereon.

4,714,470

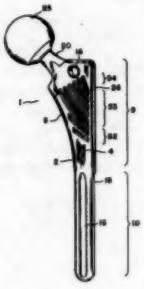
GROOVED PROSTHETIC IMPLANT

John D. Webb, Jr., Etna Green; Roy Y. Hori, Warsaw, and George E. Simpson, Fort Wayne, all of Ind., assignors to Zimmer, Inc., Warsaw, Ind.

Filed Feb. 19, 1986, Ser. No. 830,827

Int. Cl.[4] A61F *2/30*

U.S. Cl. 623—18 **18 Claims**



1. A prosthetic implant including a stem having a proximal end and a distal end and a pair of sidewalls each including a plurality of discrete grooves arcuately disposed at the proximal end of the stem wherein the stem further includes a medial side and a lateral side separating the pair of sidewalls, and wherein the plurality of grooves are each segments of curves generated from radii having a center of curvature offset from the stem in a generally lateral direction.

4,714,471

FEMUR PROSTHESIS PART OF A KNEE JOINT ENDOPROSTHESIS

Hans Grundei, Lübeck, Fed. Rep. of Germany, assignor to S + G Implants GmbH, Lübeck, Fed. Rep. of Germany

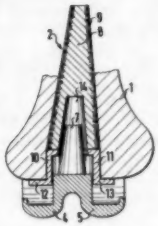
Continuation of Ser. No. 779,512, Sep. 24, 1985, abandoned. This application Oct. 22, 1986, Ser. No. 921,840

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1984, 3435243

Int. Cl.[4] A61F *2/38*

U.S. Cl. 623—20 **1 Claim**

1. A femur prosthesis part of a knee joint endoprosthesis comprising a pair of convex sledges connected by a bridge and adapted to be supported on concave tibia slide surfaces, comprising a metallic stem of the femur prosthesis part to be anchored irreleasably by an open-cell metallic layer in the hole of the femur bone, said stem being provided at its lower end with a tapering cone-shaped bore and downwardly extending fork arms provided with lateral flanges having upper surfaces for supporting the lower cut face of the femur bone, said fork arms defining therebetween a bore having tapered walls communicating with said tapered cone-shaped bore, a conical pin hav-



ing a tapered wall surface for engagement with tapered walls of said bores, said conical pin being supported by said bridge for insertion into said bores, said pair of sledges having depressions to accomodate and receive the undersurfaces of said lateral flanges.

4,714,472

KNEE PROSTHESIS WITH ACCOMMODATION FOR ANGULAR MISALIGNMENT

Robert G. Averill, Ringwood; Alex Khowaylo, Allendale, and Christopher G. Sidebotham, Bergenfield, all of N.J., assignors to Osteonics Corp., Allendale, N.J.

Filed Jan. 20, 1987, Ser. No. 4,525

Int. Cl.[4] A61F *2/38*

U.S. Cl. 623—20 **5 Claims**

1. In a knee prosthesis having a femoral component and a tibial component, the tibial component including a bearing member and the femoral component including an arcuate element for confronting and engaging the bearing member to accomplish articulation of the prosthesis, the femoral component and the tibial component ordinarily being aligned axially along a mechanical axis passing through the femoral head of the corresponding hip joint and the engagement between the arcuate element of the femoral component and the bearing member of the tibial component ordinarily taking place along complementary articular surface areas of the arcuate element and the bearing member, the improvement comprising misalignment accommodating means for accommodating limited angular misalignment between the femoral component and the tibial component while maintaining engagement between the arcuate element and the bearing member along complementary articular surface areas, said misalignment accommmodating means including complementary medial-lateral surface profile

contours along the complementary articular surface areas, said surface profile contours having a medial-lateral articular radius defining an arcuate profile, the origin of which radius lies generally along said mechanical axis such that upon angular misalignment of the femoral component and the tibial component, the resulting relative medial-lateral displacement of the articular surface areas will be accommodated while area engagement between the arcuate element and the bearing member is maintained along said complementary articular surface areas.

4,714,473

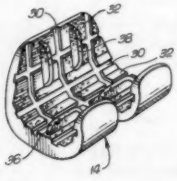
KNEE PROSTHESIS

Roy D. Bloebaum, Phoenix, Ariz., assignor to Harrington Arthritis Research Center, Phoenix, Ariz.

Filed Jul. 25, 1985, Ser. No. 759,453

Int. Cl.[4] A61F *2/38*

U.S. Cl. 623—20 **31 Claims**



1. A prosthetic joint, comprising:

a femoral component having a base surface for biological ingrowth attachment to the femor of a patient; and

a tibial component having a base surface for biological ingrowth attachment to the tibia of a patient;

said base surfaces of said femoral and tibial components each being defined by a plurality of relatively shallow and relatively smooth channels subdividing said base surfaces into a plurality of attachment zones, said attachment zones including a selected porous biological ingrowth material, said ingrowth material being applied as a coating to said attachment zones, said channels being uncoated.

4,714,474

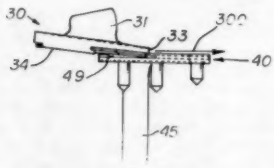
TIBIAL KNEE JOINT PROSTHESIS WITH REMOVABLE ARTICULATING SURFACE INSERT

John G. Brooks, Jr., Memphis, and Walter P. Spires, Jr., Cordova, both of Tenn., assignors to Dow Corning Wright Corporation, Arlington, Tenn.

Filed May 12, 1986, Ser. No. 861,892

Int. Cl.[4] A61F *2/38*

U.S. Cl. 623—20 **5 Claims**



1. A surgically implantable knee joint prosthesis for the replacement of at least one articulating surface of a proximal tibia comprising, in combination,

a base having an anterior region and a posterior region corresponding to the anterior and posterior surfaces of the tibia on which it is implanted, the regions being bounded by a lateral and a medial edge, said base having a lower surface adapted to be permanently fixed to a surgically prepared superior surface of said proximal tibia and said base having an upper surface having a first retaining wall means comprising at least one undercut raised retaining wall extending along at least a portion of the peripheral edge of the posterior region of the upper surface of said base and further extending along at least a portion of the peripheral medial and lateral edges of the upper surface of said base and a second raised retaining wall means on said upper surface which is opposite and separated from the first wall means on both the lateral and the medial edge of said base, said second wall means comprising at least one raised wall extending along at least a portion of the central one-fourth to two-thirds of the peripheral edge of the anterior region of said upper surface, and

a removable articulation insert of a hard synthetic polymer having an upper surface which is configured to receive at least one condyle present on a distal femur situated above said tibia and a lower surface which is adapted to closely mate with and slidingly engage said first retaining wall means and to pass over and contact said second wall means in a locking engagement such that the insert is firmly held within said base until such time as the insert is released by raising the lower surface of the insert above said second wall and sliding the insert anteriorly away from said base, said base and the insert being constructed of materials suitable for implantation within the body and having physical properties which permit such sliding and locking engagement, the separation between said first wall means and said second wall means being sufficient to permit said insert to be slidingly engaged and received in the above manner.

4,714,475

TIBIAL MEMBER OF A KNEE JOINT ENDOPROTHESIS

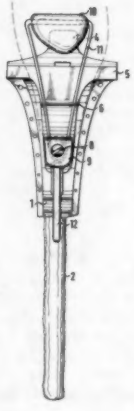
Hans Grundei, Lübeck, and Reinhard Aigner, Munich, both of Fed. Rep. of Germany, assignors to S + G Implants GmbH, Lübeck, Fed. Rep. of Germany

Filed Feb. 19, 1986, Ser. No. 831,363

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1985, 3507155

Int. Cl.[4] A61F *2/38*

U.S. Cl. 623—20 **4 Claims**



1. In a tibial member of a knee joint prosthesis used as a substitute for a resectioned tibia head comprising a proximal joint portion connected to an intermediate bridge element, a distal stem portion extending distally from said bridge element adapted to be anchored in a prepared tibia and a clamping element adapted to be secured to said bridge element for fastening tendon extremities of a patella thereto, the improvement

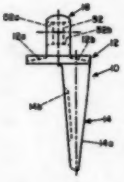
comprising said bridge element having front and rear surfaces wherein said front surface is provided with an elongated downwardly directed flap member secured thereto at a proximal region near said joint portion and at a distal region rear said stem; said flap member having formed in a distal region thereof a concave pan having rounded edges to cooperatively mate with a complementary convex rear surface of said clamping element whereupon engagement of said clamping element to said pan operatively secures said tendon extremities therebetween.

4,714,476

WRIST JOINT PROSTHESIS

Chitranjan S. Ranawat, Alpine, N.J.; Lee R. Straub, New York; Allan E. Inglis, Rye, both of N.Y., and Albert H. Burstein, Stamford, Conn., assignors to New York Society for the Relief of the Ruptured and Crippled, New York, N.Y.

Filed Jan. 27, 1987, Ser. No. 6,984
Int. Cl.[4] A61F 2/42
U.S. Cl. 623—21 5 Claims



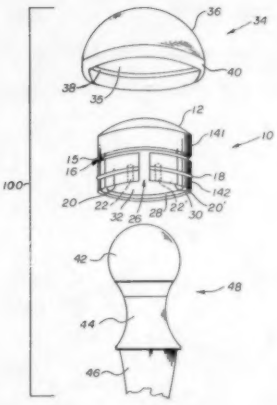
1. A total wrist joint prosthesis comprising a metal radial component having a stem adapted to be received in the distal portion of the radial medullary canal and secured therein; a plate-like portion adapted to reside at the distal end of the residual anatomical radius, and a boss extending distally from the plate-like portion, the boss being offset from the axis of the stem in both the ulnar and volar directions, having a transverse hole and having a spherical surface along its volar, distal and dorsal aspects; a metal metacarpal component having a generally U-shaped body portion composed of laterally spaced-apart legs that are adapted to straddle the boss of the radial component and a base interconnecting the legs and having stems that extend distally from the base and are adapted to be received in the proximal portions of the second and third metacarpals and to be secured therein; a metal axle extending between and joined to the legs of the metacarpal component and passing through the hole in the boss of the radial component; a sleeve of polymeric material surrounding the portion of the axle within the hole, the sleeve being in clearance with the hole to afford constrained radio-ulnar angulation and axial rotation of the metacarpal component relative to the radial component; and a generally U-shaped bearing component of a polymeric material received proximally to the boss within the base portion of the metacarpal component, the bearing component having a spherical seat matching and engageable by the spherical surface of the radial boss for flexural articulation of the prosthetic joint and having dorsal and volar surfaces adapted to engage the dorsal and volar aspects of the plate-like portion of the radial component and in conjunction with engagements between the sleeve and the hole in the boss restrain extension and flexion of the metacarpal component to magnitudes corresponding substantially to those of an anatomical wrist joint, and having convexly curved proximal surfaces that are adapted to engage distal surfaces of the plate-like portion of the radial component on either side of the boss to restrain radio-ulnar angulation of the metacarpal component to a magnitude corresponding substantially to those of the anatomical wrist joint.

4,714,477

BALL-AND-SOCKET JOINT PROSTHESIS WITH BEARING INSERT

Alfred J. Fichera, Cordova, and Samuel J. Chiarizzio, Memphis, both of Tenn., assignors to Dow Corning Wright Corporation, Arlington, Tenn.

Filed Aug. 8, 1986, Ser. No. 894,589
Int. Cl.[4] A61F 2/34
U.S. Cl. 623—22 10 Claims



1. A ball-and-socket joint prosthesis which comprises:

(A) a shell element having an inside surface and an outside surface; and

(B) a generally spherical ball component for insertion within

(C) a bearing insert element which is open-ended at its bottom, the bottom of the insert opening to a generally spherical inside surface for receiving the ball component, the insert having an outside surface which is shaped to mate with the inside surface of the shell, the dimensions of the inside surface of the insert being such that after insertion, the ball component is allowed to freely swivel, but is retained within the insert after the insert containing the ball component is locked within the shell,

the shell element and the insert element having a locking mechanism consisting of a protruding portion extending a major distance around a side surface of one element for locking engagement with an opposed mating depression in the other element,

the insert having a substantially horizontal slot, situated above that portion of the locking mechanism present on the insert, which slot extends around a major portion of the insert but less than the entire periphery of the insert to thereby provide a connecting portion;

the insert having a single slot extending from the bottom of the insert up to the horizontal slot to thereby form at least one movable finger attached to the remainder of the insert by the connecting portion, the single slot having a sufficient width and each finger having dimensions relative to the ball component to permit removal of the insert containing the ball component from the shell when the single slot is at least partially closed through use of

a means on the insert for moving at least one finger and permitting at least partial closure of the single slot.

4,714,478

PROSTHESIS, METHOD, AND TOOL FOR INSTALLING SAME

William B. Fischer, 707 N. Fairbanks Ct., Chicago, Ill. 60611

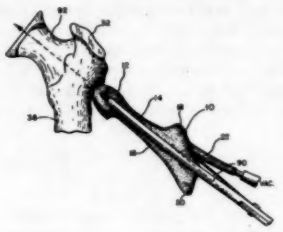
Filed Jan. 17, 1986, Ser. No. 820,549
Int. Cl.[4] A61F *2/36*
U.S. Cl. 623—23 **7 Claims**

1. A unitary, flexible, collapsible, hollow hip endoprosthesis comprising:

a. a ball portion;

b. a neck portion attached to and communicating with the ball portion;

c. a body portion attached to and communicating with the neck portion, said body portion being shaped to conform to the interior of the intermedullary space, including the trochanteric region and the stem region; and



d. an access opening in said body portion opposite the ball portion.

4,714,479

WASHING PROCESS FOR SENSITIVE FABRICS

Heinz-Manfred Wilsberg, Cologne, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 757,968, Jul. 23, 1985, abandoned. This application Jan. 16, 1987, Ser. No. 5,312

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1984, 3427078

Int. Cl.[4] D06M *13/46;* C11D *1/29*

U.S. Cl. 8—137 21 Claims

1. A process for washing a fabric of wool or silk comprising the steps of

A. washing the fabric with a wash effective quantity of an aqueous liquid detergent composition free from inorganic builder salts and optical brighteners, and having a pH of from about 6 to about 8, said composition consisting essentially of

(a) from about 5 to about 25% by weight of the sodium salt of an alkyl glycol ether sulfate of primary C_{12}–C_{18}-alcohols containing on average from 1 to 3 ethylene glycol ether groups,

(b) from about 0.5 to about 5% by weight of a fatty acid monoethanolamide of C_{12}–C_{18}-fatty acids containing at least 50 mole % of saturated C_{12}–C_{14}-fatty acids,

(c) from about 0.1 to about 1% by weight of an emulsified silicone defoamer,

(d) from 0 to about 5% by weight of non-surface-active, non-alkaline detergent additives, and

(e) remainder water, wherein the ratio by weight of component (a) to component (b) is between about 3:1 and about 50:1; and

B. rinsing the fabric to remove the aqueous detergent composition therefrom.

4,714,480

REMOVAL OF ACID GASES FROM A GAS MIXTURE

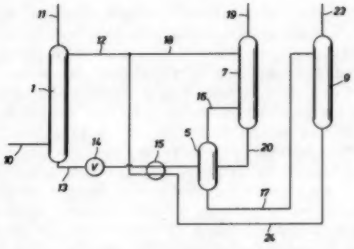
Derk H. N. Wansink, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 15, 1986, Ser. No. 941,884

Claims priority, application Netherlands, Jan. 9, 1986, 8600030

Int. Cl.[4] B01D *19/00*

U.S. Cl. 55—43 5 Claims



1. A process for the selective removal of H_2S from a gas mixture containing H_2S and CO_2, comprising:

(a) contacting in a first contact zone at elevated pressure the gas mixture with a lean and regenerable absorbent, from which zone purified gas mixture and a first loaded absorbent containing H_2S and CO_2 are removed;

(b) heating the first loaded absorbent and flashing in a separating vessel at reduced pressure a substantially CO_2-containing off-gas including a minor amount of H_2S from the first loaded absorbent, from which separating vessel off-gas and partly loaded absorbent are removed;

(c) contacting in a second contact zone the off-gas with a lean and regenerable absorbent that selectively absorbs H_2S, from which zone an almost H_2S-free CO_2-containing gas mixture and a second loaded absorbent are removed;

(d) adding the second loaded absorbent to the first loaded absorbent in the separating vessel or upstream of the heating in step (b);

(e) introducing the partly loaded absorbent from steps (b) and (d) into a regeneration zone and obtaining a regenerated absorbent used as the lean and regenerable absorbent in steps (a) and (c), and a substantially H_2S-containing gas mixture.

4,714,481

GAS SEPARATION MEMBRANE

Junichi Matsuura, Kamakura, and Munehisa Okada, Machida, both of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

PCT No. PCT/JP82/00454, § 371 Date Jul. 20, 1983, § 102(e) Date Jul. 20, 1983, PCT Pub. No. WO83/01905, PCT Pub. Date Jun. 9, 1983

PCT Filed Nov. 30, 1982, Ser. No. 530,598

Claims priority, application Japan, Nov. 30, 1981, 56-192373

Int. Cl.[4] B01D *53/22*

U.S. Cl. 55—158 6 Claims

1. A gas separation membrane, comprising:

a membrane of a polymer having as its main repeating units, a unit of the formula:

and/or the formula

wherein R is an alkyl group, a vinyl group, an allyl group, a cycloalkyl group, an aryl group, a benzyl group or a hydrogen atom, with the R groups independently being identical or different, said polymer having a number average molecular weight of between 1,000–1,000,000, or a polymer having up to 80% of its unsaturated bonds hydrogenated.

4,714,482

THIN FILM POLYMER BLEND MEMBRANES

Anthony J. Polak, Lake Zurich, and Ping Young, Hoffman Estates, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Jul. 11, 1985, Ser. No. 753,753

Int. Cl.[4] B01D *53/22*

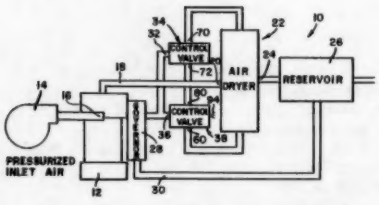
U.S. Cl. 55—158 19 Claims

1. A thin film polymer blend membrane comprised of a solution blend of (1) a component selected from the group consisting of (i) an organic polymer selected from the group consisting of polyvinyl alcohol, polyvinylfluoride, polyethyleneimine, polyethylene glycol, cellulose acetate, polyvinylmethylethyl ether and phenol formaldehylde resins and (ii) a copolymer having as a repeat unit one of the monomers of component (i), (2) a component selected from the group consisting of (i) a polymer selected from the group consisting of polyacrylic acid, polymethacrylic acid and polystyrene sulfonic acid and (ii) a copolymer having as a repeat unit one of the monomers of component (i), and (3) an inorganic compound selected from the group consisting of phosphoric acid, sulfuric acid, heteropoly acids and salts of heteropoly acids.

4,714,483
AIR DRYER PURGE CONTROL FOR TURBOCHARGED COMPRESSORS

James P. Koening, Olmsted Township, Cuyahoga County; David J. Knight, Avon Lake; James E. Szudy, Parma; Roy E. Bartholomew, and William R. Wurst, both of Elyria, all of Ohio, assignors to Allied Corporation, Morristown, N.J.

Filed Jun. 13, 1986, Ser. No. 873,899
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—163 14 Claims



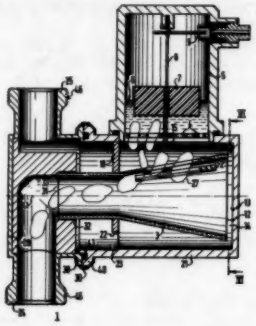
1. Compressed air system comprising a reservior, an air compressor having a discharge line communicated to the reservoir for charging the latter to a predetermined pressure level, an air dryer in said discharge line for drying compressed air communicated to the reservoir, means for segregating from said reservoir a segregated air volume, said air dryer including a purgable desiccant and being responsive to a pressure signal to regenerate said desiccant by communicating said segregated air volume through the desiccant in a direction opposite to the direction air is communicated through the desiccant when the reservoir is charged, a governor responsive to the pressure level in the reservoir to unload the air compressor and generate said pressure signal when the pressure level in the reservoir attains said predetermined level, and valve means between said governor and said air dryer and responsive to the pressure level in said segregated air volume and to said pressure signal to control communication of the pressure signal to the air dryer whereby said pressure signal is terminated when the pressure level of said segregated air volume drops below a predetermined level.

4,714,484
VENTILATING DEVICE

Hans-Dieter Kühl, Mundelsheim, and Hans-Dieter Schmidt, Remseck, both of Fed. Rep. of Germany, assignors to Deutsche Vortex GmbH, Monchen-Gladbach, Fed. Rep. of Germany

Filed May 1, 1986, Ser. No. 858,395
Claims priority, application Fed. Rep. of Germany, May 3, 1985, 3515936
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—170 11 Claims

1. Ventilating device for a gas-carrying flowing liquid medium, comprising a gas collecting chamber having an open bottom, a housing disposed below and connected to said collecting chamber, an inlet element connected to said housing, a tube in the form of a diffuser having an end and being disposed substantially horizontally in said housing below said gas collecting chamber for conducting the medium from said inlet element and reducing the velocity of the medium, said tube defining a space surrounding said tube in said housing, and said tube having a wall with lateral openings formed therein permitting gas bubbles to rise through said wall openings into said space and from said space into said gas collecting chamber, an impact surface disposed in front of said end of said tube as seen in flow direction, means in the form of a relatively narrow passage between said impact surface and said end of said tube for increasing the velocity of the medium and an outlet element

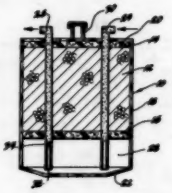


connected to said housing for the liquid downstream of said space.

4,714,485
FUEL VAPOR STORAGE CANISTER

Charles H. Covert, Manchester; William E. Gifford, Hemlock, both of N.Y.; Craig G. Kemler, De Witt, Mich., and Gordon R. Paddock, Rochester, N.Y., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 851,548, Apr. 14, 1986, abandoned. This application Oct. 15, 1986, Ser. No. 918,886
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—189 2 Claims



1. A fuel vapor storage canister comprising a housing having an inlet chamber, a region vented to the atmosphere, and a bed of material adapted to adsorb fuel vapor disposed between said chamber and said region, a fuel vapor inlet tube opening to said chamber whereby fuel vapor may be introduced to said canister and flow from said chamber into said bed and said bed may adsorb said fuel vapor, and a purge tube opening to said chamber whereby vacuum applied to said purge tube may cause air to flow from said region through said bed to said chamber and whereby said air flow may desorb fuel vapor from said bed, and wherein said purge tube has a liquid purge hole disposed near the bottom of said chamber and a vapor purge hole spaced substantially above the bottom of said chamber, whereby said chamber serves as a trap for liquid fuel introduced through said inlet tube, and whereby said liquid fuel is purged from said chamber along with said air flow and desorbed fuel vapor.

4,714,486
AUTOMATED PRODUCTION OF CANISTERS

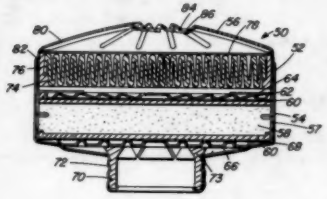
Gideon C. Silverthorn, Kanata, Canada, assignor to Her Majesty the Queen in right of Canada, Ottawa, Canada

Filed Jun. 6, 1986, Ser. No. 871,378
Claims priority, application Canada, Jul. 3, 1985, 486234
Int. Cl.[4] B01D *50/00*
U.S. Cl. 55—316 9 Claims

1. In a filter canister for use on a gas mask comprising a body

with an inlet and an outlet, a filter for particulate material and an adsorbent material filter arranged in the body in sequence between the inlet and outlet, the improvement comprising:

a body including a rigid, cup-shaped top part with the inlet and a rigid, cup-shaped bottom part with the outlet, the two parts having respective cylindrical side walls engaged telescopically with one another and being sealed together with an adhesive sealant;



a filter for particulate material sealed into the top part; and

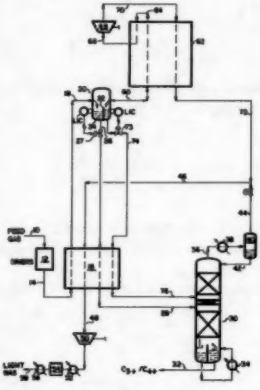
an absorbent filter comprising a separate cartridge with a bed of absorbent material housed in a rigid, cylindrical wall, the cartridge being fitted into the bottom part and sealed therein, whereby a double wall of rigid material is provided around the absorbent material bed.

4,714,487

PROCESS FOR RECOVERY AND PURIFICATION OF C_3-C_{4+} HYDROCARBONS USING SEGREGATED PHASE SEPARATION AND DEPHLEGMATION

Howard C. Rowles, Center Valley, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 23, 1986, Ser. No. 867,350
Int. Cl.[4] F25J *3/02*
U.S. Cl. 62—24 **6 Claims**



1. A process for the low temperature separation of a feed gas into a heavy hydrocarbon stream containing C_{3+} and/or C_{4+} hydrocarbons and a light gas stream containing H_2, N_2, CO, CO_2, methane, and/or C_2 hydrocarbons comprising the steps of:

(a) cooling the feed gas to effect the partial condensation of said gas by indirect heat exchange against process streams;

(b) initially phase separating the partially condensed feed gas into a first heavy liquid stream containing heavy hydrocarbons and a first vapor stream containing light feed gas components;

(c) rectifying the first vapor stream by low temperature dephlegmation to produce a first light gas stream and a second heavy liquid stream which is segregated from the first heavy liquid stream wherein said first vapor stream is cooled in the dephlegmation by indirect heat exchange with said first light gas stream which is expanded to a lower temperature and pressure;

(d) expanding the first and second heavy liquid streams to a lower pressure and temperature and cooling the feed gas with one or both of said streams by indirect heat exchange sufficiently to partially vaporize said stream(s) as process streams of step (a);

(e) separately introducing said first and second heavy streams into a distillation column operated with an overhead condenser and a bottom reboiler;

(f) separating said streams in said distillation column into a heavy hydrocarbon stream C_{3+} and/or C_{4+} hydrocarbons as a bottom product and a second light gas stream; and

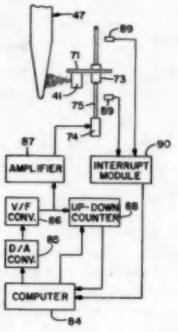
(g) recovering said first light gas stream and said second light gas stream to produce one or more product light gas stream(s) containing H_2, N_2, CO, CO_2, methane, and/or C_2 hydrocarbons.

4,714,488

APPARATUS FOR PRODUCING AN OPTICAL FIBER PREFORM

Dale R. Powers, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 427,523, Sep. 29, 1982, Pat. No. 4,568,370.
This application Oct. 25, 1985, Ser. No. 791,600
Int. Cl.[4] C03B *23/04, 37/02, 19/06*
U.S. Cl. 65—13 **7 Claims**



1. Apparatus for forming a porous glass preform comprising

means for supporting an elongated cylindrical core member,

means for rotating said core member,

means for longitudinally moving said core member in a first direction, and

means for depositing on said core member a coating of particulate material having a given thickness throughout a portion of said core length and a thickness which tapers from said given thickness to zero thickness at one end thereof,

said means for depositing comprising

first source means positioned adjacent said core member for directing a stream of glass particles toward a lateral surface of said core member,

means for reciprocatingly moving said first source means along that portion of the length of said core member along which the tapered portion of said coating extends,

second source means positioned adjacent said core member for directing a stream of glass particles toward a lateral surface of said core member,

means for reciprocatingly moving said second source means along a portion of the length of said core member along which the tapered portion of said coating extends, said means for moving said first and second source means

being at least partially axially coextensive such that said first and second source means are capable of simultaneously depositing glass particles on the same longitudinal region of said core member, and

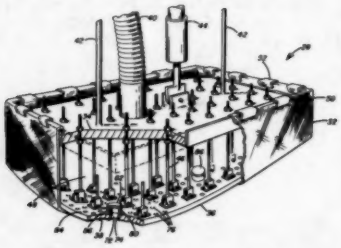
means for independently varying the velocities of movement of said first and second source means such that at any given time the velocity of said first source means is different from that of said second source means and such that the velocities of said first and second source means are continuously variable during the reciprocating movement thereof.

4,714,489

VACUUM PRESS CONSTRUCTION

Terry A. Bennett, Monroeville, Pa., and James E. Carino, Evansville, Ind., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 5, 1987, Ser. No. 616
Int. Cl.[4] C03B *23/02*
U.S. Cl. 65—104 **18 Claims**



1. An apparatus for press bending heat softened glass sheets having at least one aperture of the type including means to heat said sheets to their heat softened temperature, a first vacuum mold with an apertured lower wall having a sheet engaging surface conforming to the final desired shape of said sheet, a second mold with an engaging surface complementing at least a portion of said sheet engaging surface of said first mold wherein said heat softened glass sheet is sandwiched in pressing engagement therebetween, means to convey said heat softened sheet from said heating means to said molds and means to draw a vacuum through said first mold, the improvement comprising:

a hole in said engaging surface of said vacuum mold positioned adjacent said aperture in said heat softened glass sheet in facing relation thereto; and

means to seal said hole to prevent vacuum from being drawn therethrough, said sealing means spaced from said engaging surface of said first mold.

16. A method of shaping a heat softened glass sheet having at least one aperture comprising:

heating said glass sheet to its heat softened temperature;

providing a hole in a shaping surface of a vacuum mold;

aligning said sheet with said shaping surface of said vacuum mold to align said hole in said shaping surface with said aperture in said glass sheet;

engaging said glass sheet with said shaping surface;

drawing a vacuum through said vacuum mold to hold said shaped glass sheet thereagainst; while

sealing said hole in said shaping surface so as to prevent vacuum from being drawn therethrough.

4,714,490

CONCRETION PREVENTING AGENT FOR FERTILIZERS

Tetsuji Iwasaki, Wakayama, Japan, assignor to Kao Corporation, Tokyo, Japan

Filed Apr. 23, 1986, Ser. No. 856,066
Claims priority, application Japan, May 8, 1985, 60-97557
Int. Cl.[4] C05G *3/00*
U.S. Cl. 71—27 **5 Claims**

1. A method for preventing a fertilizer from concretion comprising mixing said fertilizer with from about 0.005 to 1.0 percent by weight, based on the weight of the fertilizer, of a compound of the formula:

$$R—CHO \qquad (I)$$

in which R is an alkyl, an alkenyl, a hydroxyalkyl or a hydroxyalkenyl, having 4 to 30 carbon atoms and being either straight chained or branched.

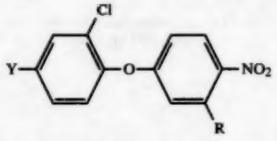
4,714,491

DIPHENYL ETHER HERBICIDES

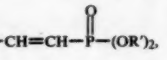
Michael P. Prisbylla, Richmond, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Oct. 7, 1983, Ser. No. 539,784
Int. Cl.[4] A01N *57/02*; C07F *9/40*
U.S. Cl. 71—86 **10 Claims**

1. A method for controlling undesirable weed pests which comprises applying to the locus were control is desired a herbicidally effective amount of a compound having the formula

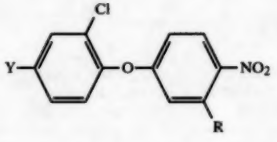


wherein Y is chlorine or trifluoromethyl, and wherein R is selected from those having the formula

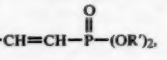


in which R' is selected from the group consisting of lower alkyl groups having from 1 to 3 carbon atoms and agriculturally acceptable salts thereof.

3. As compounds, diphenyl ether derivatives of the formula



wherein Y is chlorine or trifluoromethyl, and wherein R is selected from those having the formula



in which R' is selected from the group consisting of lower alkyl groups having from 1 to 3 carbon atoms.

4,714,492

CERTAIN 2-PHENYL-4-OXO-NICOTINATES AND THEIR USE FOR INDUCING MALE STERILITY IN A CEREAL GRAIN PLANT

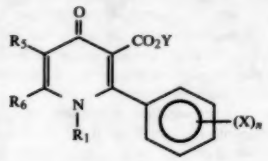
Glenn R. Carlson, North Wales, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation of Ser. No. 260,577, May 5, 1981, which is a continuation-in-part of Ser. No. 250,711, Apr. 16, 1981, abandoned, which is a continuation-in-part of Ser. No. 148,079, May 12, 1980, abandoned. This application Jul. 1, 1983, Ser. No. 509,981

Int. Cl.[4] C07D *211/84;* A01N *43/40*

U.S. Cl. 71—94 16 Claims

1. A compound of the formula:



wherein

R_1 is a (C_1–C_6)alkyl or allyl group;

R_5 is a hydrogen or bromine atom or a (C_1–C_3)alkyl group;

R_6 is a (C_1–C_6)alkyl group;

Y is hydrogen,

X is hydrogen or halogen atom; and

n is the integer 1 or 2 and the agronomically acceptable acid addition, sodium or potassium salts thereof.

4,714,493

ISOTHIOUREA HERBICIDAL COMPOSITION

Marcelo Kogan, Wilton, Conn.; Stephen E. Dinizo, San Lorenzo, and Llewellyn W. Fancher, New Castle, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed May 24, 1985, Ser. No. 737,639

Int. Cl.[4] A01N *38/08;* C07C *119/18*

U.S. Cl. 71—99 3 Claims

1. The compound N,N'-(N''-isopropylcarbamyl,N'''-isopropylcarbamyl)-S-ethylisothiourea.

4,714,494

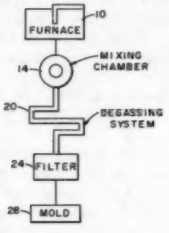
TROUGH SHEAR DIFFUSOR APPARATUS FOR FLUXING MOLTEN METAL AND METHOD

Charles E. Eckert, Plum Boro, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 8, 1986, Ser. No. 939,145

Int. Cl.[4] C21C *7/00*

U.S. Cl. 75—66 18 Claims



1. A method for removing impurities from a molten metal which comprises:

(a) flowing molten metal at a velocity of at least 0.1 cm/second through an enclosed passageway having an inlet section and an outlet section and consisting essentially of a top wall, sidewalls, and a bottom wall, at least one of such walls further comprising one or more porous portions through which said molten metal flows;

(b) introducing into said enclosed passageway, through said porous wall portion, in a direction generally normal to the flow of molten metal in said passageway, gas capable of removing impurities from said molten metal within said enclosed passageway;

whereby the velocity of said molten metal flow through said porous wall portion normal to said gas flow will be capable alone of detaching gas bubbles as they are formed in said passageway, in the absence of moving parts in said passageway, resulting in smaller bubbles with larger gas/metal interface to achieve high contact area between said gas and said molten metal to thereby remove said impurities from said molten metal.

4,714,495

SOLVENT, INK AND COATED PAPER FOR CARBONLESS COPYING SYSTEM

Yoshio Okada, Matsudo; Masahiro Akatsu, and Yohichi Ohira, both of Iwaki, all of Japan, assignors to Kupeha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 20, 1986, Ser. No. 932,570

Claims priority, application Japan, Apr. 9, 1986, 61-81780

Int. Cl.[4] C09D *11/00*

U.S. Cl. 106—21 12 Claims

1. A solvent composition for carbonless copying, comprising a mixture of diisopropylnaphthalene isomers having a content of 2,7-isomer of 50 wt.% or more.

4,714,496

WAX COMPOSITIONS

Clement H. Luken, Jr., Highland Heights, and Donald V. Kinsman, Fort Thomas, both of Ky., assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Feb. 18, 1986, Ser. No. 830,044

Int. Cl.[4] C08L *91/06*

U.S. Cl. 106—270 11 Claims

1. A wax composition comprising

(a) a paraffin melting in the range 50° C. to 65° C.;

(b) a C_{16} or C_{18} saturated fatty acid or fatty acid mixture comprised predominantly of C_{16} and C_{18} saturated fatty acids; and

(c) an alpha-alkyl-branched carboxylic acid obtained by the free radical addition of a C_{20-44} alpha-olefin or alpha-olefin mixture with a carboxylic acid having from 3 to 36 carbon atoms, said wax composition containing 90 to 98 parts by weight (a) and (b) present in a ratio from 9:1 to 1:9 and 2 to 10 parts by weight (c).

4,714,497

PROCESS FOR THE PREPARATION OF FERROUS PARTS OF A COLOR TELEVISION TUBE AND FURNACE FOR OPERATING SUCH A PROCESS

Bernard Poncet, Lyons, France, assignor to Videocolor, Montrouge, France

Filed Feb. 6, 1984, Ser. No. 577,401

Int. Cl.[4] C23C *8/14*

U.S. Cl. 148—6.35 7 Claims

1. A method for preparing discrete ferrous components, comprising the steps:

positioning the components on a substantially planar carrier;

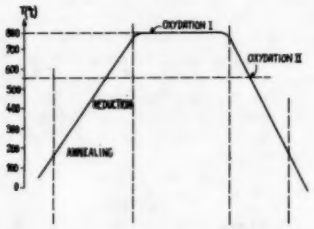
introducing the components into a single chamber furnace;

subjecting the components to increasing temperature in the presence of a reducing gas as it passes through a first section of the chamber wherein the pressure of the gas is above ambient and flows continuously through the chamber to a furnace exit;

subjecting the components to stable temperature in a first oxidation environment while passing through a second

section of the chamber directly connected to the first section, without intervening barriers in between, wherein the reducing gas flows from the first to the second section and mixes with an oxidation gas;

subjecting the components to decreasing temperature in a second oxidation environment while passing through a



third section of the chamber directly connected to the first and second sections, without intervening barriers therebetween;

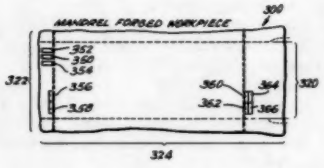
directing the components out of the furnace after traversing the three sections of the single chamber, along a substantially planar path and wherein the gas in the third section exits therefrom to create gas flow through the chamber.

4,714,498

PROCESS FOR PRODUCING LARGE SECTION, LARGE MASS FORGED SLEEVES FROM LARGE DIAMETER INGOTS OF ALLOY 625

Ashok K. Khare, Warren, Pa., assignor to National Forge Company, Irvine, Pa.

Filed Jun. 27, 1986, Ser. No. 879,479
Int. Cl.[4] C22F 1/10
U.S. Cl. 148—11.5 N **22 Claims**



1. A process for producing large section, large mass forged sleeves from large diameter ingots of alloy 625 consisting essentially of a limiting composition by weight percentage of 58.0 min. nickel, 20.0–23.0 chromium, 5.0 max, iron, 8.0–10.0 molybdenum, 3.15–4.15 columbium (plus tantalium), 0.10 max. carbon, 0.50 max. manganese, 0.50 max. silicon, 0.015 max. phosphorus, 0.015 max. sulphur, 0.40 max. aluminum, 0.40 titanium, and 1.0 max. cobalt (if determined), comprising the steps of:

(a) forming a workpiece from the large diameter ingot which further comprises the substeps of,

(1) making a first saw cut through a toe portion of the ingot near an as cast end traverse to the longitudinal axis of the ingot and removing from the ingot a slice of predetermined width, and forming a first sawed end of the workpiece at the sawed surface,

(2) facing the first sawed end of the workpiece,

(3) trepanning a bore in the ingot in the first sawed end of a predetermined diameter to a predetermined depth with a trepanning means,

(4) making a second saw cut through the toe portion of the ingot to separate the workpiece from the remainder of the ingot a predetermined distance from the first sawed end traverse to the longitudinal axis of the ingot and forming a second sawed end for the workpiece, with the second saw cut being made at a distance less than or equal to the depth of the trepanned bore in the ingot,

(5) facing the second sawed end of the workpiece;

(b) saddle forging the workpiece which further comprises the substeps of,

(1) heating the workpiece to a temperature of 2125° F.,

(2) placing the workpiece on a preheated saddle forging mandrel,

(3) working the workpiece by rotating the workpiece in steps with a first manipulator means and at each step applying a saddle forging die having a width substantially the same as the total length of the workpiece, with the saddle forging die applying a pressure of 3000 tons to the workpiece until the workpiece stops moving when the saddle forging die is applied, and rotating the workpiece for each successive step an amount to allow an overlap of a new step's press location with the previous step's press location;

(4) preheating the workpiece to a temperature of 2125° F. and repeating step (b)(3) until the trepanned bore in the workpiece is opened to a predetermined diameter;

(c) mandrel forging the saddle forged workpiece which further comprises the substeps of,

(1) heating the workpiece to a temperature of 2125° F.,

(2) placing the workpiece on a preheated mandrel forging mandrel,

(3) working the workpiece with a preheated top mandrel forging die and a preheated bottom mandrel forging die by moving the workpiece in its axial direction in steps, with each step being a portion of a mandrel forging die width, and at each step axially rotating the workpiece with a second manipulator means in increments until the workpiece is rotated at least 360° at each step, with the mandrel forging dies applying a maximum pressure of 3000 tons to the workpiece at each increment of axial rotation of the workpiece at each step, with each increment of axial rotation being an amount to allow an overlap of a new rotation increment's press location with the previous rotation increment's press location, and working the workpiece until it stops moving when the mandrel forging dies are applied,

(4) reheating the workpiece to 2125° F. and repeating step (c)(3) until a predetermined length of the workpiece is achieved,

(5) air cooling the workpiece to room temperature;

(d) thermal treating the workpiece followed by annealing the workpiece; and

(e) finish machining the workpiece to form the finished large section large mass forged sleeve.

4,714,499

FULL LENGTH FORGING METHOD FOR PRODUCING LARGE SECTION, LARGE MASS CYLINDRICAL SLEEVES OF ALLOY 625

Ashok K. Khare, Warren, Pa., assignor to National Forge Company, Irvine, Pa.

Filed Oct. 1, 1986, Ser. No. 913,939
Int. Cl.[4] C22F 1/10
U.S. Cl. 148—11.5 N **27 Claims**

1. A process for producing a large section, large mass sleeve of alloy 625 consisting essentially of a limiting composition by weight percentage of 58.0 min. nickel, 20.0–23.0 chromium, 5.0 max. iron, 8.0–10.0 molybdenum, 3.15–4.15 columbium (plus tantalium), 0.10 max. carbon, 0.50 max. manganese, 0.50 max. silicon, 0.015 max. phosphorus, 0.015 max. sulphur, 0.40 max. aluminum, 0.40 titanium, and 1.0 max. cobalt (if determined), comprising the steps of:

(a) forming a workpiece from an ingot, with the formed workpiece having a length slightly longer than the predetermined full length of the finished large section, large

mass cylindrical sleeve and a trepan bore of a predetermined diameter along the longitudinal axis;

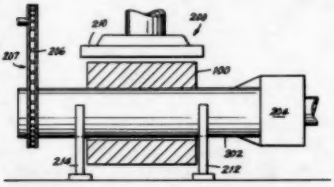
(b) saddle forging the workpiece which further comprises the substeps of,

(1) heating the workpiece to a temperature of 2000° F.,

(2) placing the workpiece on a preheated saddle forging mandrel,

(3) placing the saddle mandrel with the workpiece disposed thereon on a pair of saddles, with the saddles being positioned such that a first saddle supports a first end of the saddle forging mandrel and a second saddle supports a second end of the saddle forging mandrel with a small gap being formed between a first end of the workpiece disposed on the saddle forging mandrel and the first saddle and a small gap being formed between a second end of the workpiece disposed on the saddle forging mandrel and the second saddle,

(4) engaging a first end of the saddle forging mandrel with a manipulator means and engaging the saddle forging mandrel near the second end with a chain drive assembly,



(5) working the workpiece by rotating the workpiece in steps with the manipulator means and the chain drive assembly and at each step applying a saddle forging die having a length longer than the full length of the workpiece, with the saddle forging die applying a pressure of 3000 tons to the workpiece at each step until the workpiece stops moving, with each successive step being an amount which allows an overlap of a new step's press location with the previous step's press location,

(6) reheating the workpiece to a temperature of 2000° F. and repeating substeps (b)(2), (3), (4) and (5) for a predetermined number of heats,

(7) reheating the workpiece to a temperature of 2000° F. for the final heat, repeating steps (b)(2), (3) and (4) and then repeating substep (b)(5) after the workpiece cools to a temperature below 1950° F., and

(8) air cooling the workpiece to room temperature;

(c) thermal treating the workpiece followed by annealing the workpiece; and

(d) finish machining the workpiece to form the finished large section, large mass cylindrical sleeve.

4,714,500

METHOD FOR THERMAL TREATMENT OF PEARLITIC RAIL STEELS

Wilhelm Heller; Jürgen Flügge, both of Duisburg, and Gerhard Ratz, Butzbach, all of Fed. Rep. of Germany, assignors to Krupp Stahl AG, Bochum, Fed. Rep. of Germany

Filed Dec. 2, 1985, Ser. No. 803,744

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446794

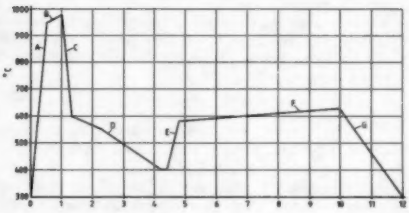
Int. Cl.[4] C21D 9/04

U.S. Cl. 148—12 R **6 Claims**

5. A method for heat treatment of pearlitic steels consisting of

0.55 to 0.82% carbon
0.25 to 0.50% silicon
0.80 to 1.30% manganese
≦0.035% phosphorous
≦0.040% sulfur
≦0.30% chromium
≦0.10% nickel
≦0.05% molybdenum
0.05 to 0.20% vanadium
0.02 to 0.10% columbium
0.010 to 0.025% nitrogen
0.010 to 0.070% aluminum

the rest being iron and usual melt impurities,



wherein after finishing hot-rolling of the rails at temperatures of about 950° to 1,000° C. compressed air is blown onto the rail head portion to provide a fine lamellar pearlitic structure in the rail head portion and after finishing the pearlite transformation at 400° C. the rail head portion is again heated up to about 600° to 650° C., whereafter the complete rail including head, web and base is rapidly cooled by means of a quenching media to a temperature of less than 100° C.

4,714,501

METHOD FOR THERMAL TREATMENT OF ALLOY FOR HEAT TRANSFER PIPES

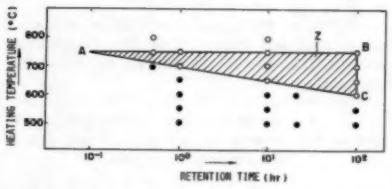
Kazuo Yamanaka, Minooshi; Hiroo Nagano, Kobeshi; Takao Minami, Amagasakishi; Yaautaka Okada, Narashi; Mamoru Inoue, Kobeshi; Hiroshi Susukida, Takasago; Kichiro Onimura, Takasago; Toshio Yonezawa, Takasago; Nobuya Sasaguri, Takasago; Katsuji Kawaguchi, Takasago, and Takaya Kusakabe, Kobe, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of, Japan

Continuation of Ser. No. 550,022, Nov. 8, 1983, abandoned. This application Nov. 15, 1985, Ser. No. 798,702

Claims priority, application Japan, Aug. 29, 1983, 58-156427

Int. Cl.[4] C22F 1/10

U.S. Cl. 148—13 **1 Claim**



1. A process for producing an alloy for heat transfer pipes with excellent alkali stress corrosion cracking resistance, said alloy consisting essentially of, in percent by weight:

not more than 0.15% C,
not more than 1.0% Si,
not more than 1.0% Mn,
25 to 35% Cr,
40 to 70% Ni,
not more than 0.5% Al,
0.01 to 1.0% Ti;

0.5 to 5.0% of a metal selected from the group consisting of Mo, W van V and mixtures thereof,

not more than 0.030% P,

not more than 0.020% S and the balance Fe and impurities, which process comprises

(1) maintaining a mixture containing the metallic components at a temperature from T°C. to (T°C.+100° C.), where T°C. is the temperature at which a carbide in the alloy is solubilized, for a period of from 1 to 120 minutes,

(2) cooling the resulting mixture to a temperature of from room temperature to 200° C., and

(3) thermally treating the resulting product at a temperature from 600° to 750° C. for a period of time from 0.1 to 100 hours while the mixture is within the area defined by the hatched portion of FIG. 2 hereof.

4,714,502

SOFT MAGNETIC STAINLESS STEEL FOR COLD FORGING

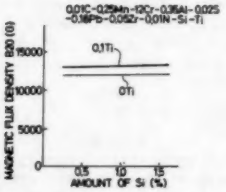
Yoshinobu Honkura, Konan; Kouji Murata, and Takashi Yokoyama, both of Tokai, all of Japan, assignors to Aichi Steel Works, Ltd., Aichen, Japan

Filed Jul. 18, 1986, Ser. No. 886,675

Claims priority, application Japan, Jul. 24, 1985, 60-163747

Int. Cl.[4] C22C *38/28*

U.S. Cl. 148—307 **6 Claims**



1. A soft magnetic stainless steel having a magnetic flux density of not less than 13,000 G, a tensile strength of not more than 41 kgf/mm^2 and a critical compressibility of not less than 50% in cold forging, consisting essentially of, by weight, up to 0.03% of C, 0.40 to 1.10% of Si, up to 0.50% of Mn, 9.0 to 19.0% of Cr, 0.31 to 0.60% of Al, 0.010 to 0.030% of S, 0.10 to 0.30% of Pb, 0.02 to 0.25% of Ti, 0.02 to 0.10% of Zr, and up to 0.03% of N, and the balance of Fe and inevitable impurities, with a proviso that the C+N content is not more than 0.040% and the Si+Al content is not more than 1.35%.

4,714,503

EMULSION-CONTAINING EXPLOSIVE COMPOSITIONS

Lawrence A. Cescon, Portogruaro, Italy; Robert W. Trebilcock, Littleton, Colo., and Robert H. Moffett, Lovettsville, Va., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 787,442, Oct. 15, 1985, Pat. No. 4,619,721. This application Oct. 2, 1986, Ser. No. 912,760

The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.

Int. Cl.[4] C06B *45/02*

U.S. Cl. 149—21 **28 Claims**

1. In a storage-stable emulsion blend explosive comprising a sensitized blend of inorganic oxidizing salt particles and a water-in-oil emulsion comprising a carbonaceous fuel having components which form a continuous emulsion phase, an aqueous solution of an inorganic oxidizing salt forming a discontinuous phase dispersed as discrete droplets within said continuous phase, and an emulsifying agent, the improvement comprising inorganic oxidizing salt particles containing at least about 10 percent by weight of a fines component comprised of inorganic oxidizing salt particles which are smaller than 297 micrometers, the weight ratio of said emulsion to the total inorganic oxidizing salt particles being in the range of about from 20/80 to 70/30.

4,714,504

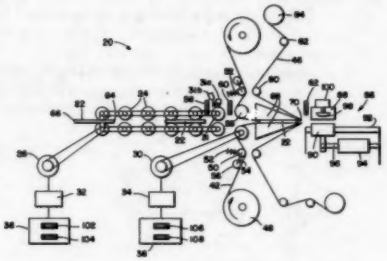
PROCESS OF LAMINATING A PHOTOSENSITIVE LAYER OF A SUBSTRATE

Michael J. Cummings, Vestal; Donald E. Hanford, Barton, and Robert M. Japp, Vestal, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Oct. 10, 1986, Ser. No. 917,716

Int. Cl.[4] B30B *15/34, 31/04, 31/10*

U.S. Cl. 156—64 **14 Claims**



1. A process for laminating discrete sections of a supported photosensitive layer to a sheet substrate comprising the steps of:

advancing the substrate to and through a nip between converging surfaces of opposed heated application rolls;

supplying a continuous length of the supported photosensitive layer to the nip;

interrupting the steps of advancing the substrate when it reaches a first location positioned between the application rolls and of supplying the photosensitive layer to the nip;

moving the converging surfaces of each of the application rolls from an inactive disengaged position transversely toward the substrate to an active position to cause pressure contact between the photosensitive layer and the substrate whereby the photosensitive layer is laminated to the substrate;

pausing for a first predetermined period of time with the application rolls in the active positions;

again advancing the substrate between the application rolls while the application rolls are in the active position;

again supplying the photosensitive layer to the nip;

interrupting the step of again advancing the substrate when it reaches a second location positioned between the application rolls and of supplying the photosensitive layer to the nip while continuing to hold the application rolls in the active position for a second predetermined period of time; and

withdrawing the application rolls to the inactive position after a lapse of the second predetermined period of time.

4,714,505

METHODS FOR HANDLING SHEET MATERIAL

Anthony G. Goodfellow, Maghull, and Anthony R. Wright, Southport, both of England, assignors to W & A Bates Limited, United Kingdom

Filed Feb. 1, 1985, Ser. No. 697,243

Claims priority, application United Kingdom, Feb. 10, 1984, 8403494

Int. Cl.[4] B29D *30/30;* B29C *31/00;* G01B *21/02*

U.S. Cl. 156—64 **4 Claims**

1. A method of feeding a ply of tire building fabric to a tire building former comprising laying a ply of fabric onto a table at a first location, transversely tilting the table while providing

a flow of air beneath the ply to permit the ply to float over the table surface into appropriate alignment against a raised side abutment of the table thus arranging the ply on the table to align one side edge of said ply with a first datum line, applying a gripping device to the ply and transversely moving the gripping device and ply in an alignment preserving manner to a second location to align said one edge with a second datum line parallel with the first datum line and which is in predetermined relationship to a tire building former to enable the ply to be fed in appropriate axial alignment to the former.

4,714,506

METHOD FOR MAKING A DUNNAGE SHOCK ABSORBER

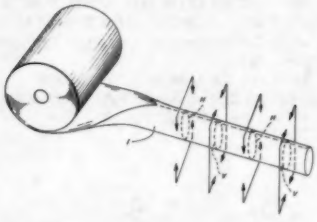
Hiroshi Yamashiro, 5-15-13 Kamiya, Setagaya-ku, Tokyo, and Ko Suzuki, 984-9 Kamigo, Ebina-shi, Kanagawa Prefecture, both of Japan

Continuation-in-part of Ser. No. 725,244, Apr. 19, 1985, abandoned, which is a continuation of Ser. No. 476,497, Mar. 18, 1983, abandoned. This application Jun. 6, 1985, Ser. No. 742,091

Claims priority, application Japan, Jul. 1, 1982, 57-98267[U]; Jul. 10, 1982, 57-104753[U]; Sep. 24, 1982, 57-164885; Jul. 13, 1984, 59-145417

Int. Cl.⁴ B32B *31/14*

U.S. Cl. 156—80 **14 Claims**



1. A process for producing a plastic shock absorber for packing comprising the steps of:

heat sealing plastic film material having at least a two layer wall structure to form a hollow cylindrical body; and

heat sealing said cylindrical body at alternating horizontal and vertical strips at suitable intervals to create a continuous series of linked, generally trigonal-shaped hollow units while blowing a gas into said cylindrical body, said gas being cooler than the ambient air when injected into said cylindrical body thereby reducing the cooling time of the heat pressed strips and producing swelled, sealed trigonal-shaped units capable of providing efficient shock absorption.

4,714,507

SURFACE COATING AGENT AND METHOD FOR USING THE SAME IN CIVIL AND CONSTRUCTION ENGINEERING

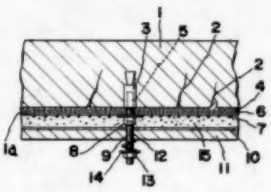
Yoshiyuki Ohgushi, 8-2, Nagao 2-chome, Johnan-ku, Fukuoka, Japan

Filed Nov. 6, 1985, Ser. No. 795,392

Int. Cl.⁴ B32B *31/12, 7/08*

U.S. Cl. 156—91 **7 Claims**

2. A method for using a surface coating agent for civil engineering and construction engineering wherein said method comprises (i) applying a composite polymer emulsion essentially consisting of carboxy-modified styrene-butadiene, cyclohexyl methacrylate and styrene polymers onto a lower surface of a floor plate so as to form a composite polymer film, (ii) mounting a plurality of bolts onto the lower surface of said floor plate so as to suspend a concrete panel from said floor plate while defining a filler space between the concrete panel and said lower surface of said floor plate, (iii) applying an upwardly urging pressure to said concrete panel plate by spring means mounted on said respective bolts, and filling a surface coating agent essentially consisting of a mixture made of (a) a principal ingredient including cement, silica sand, iron oxide, zinc oxide and glycine and (b) a composite polymer



emulsion including carboxy-modified styrene-butadiene, cyclohexyl methacrylate, and styrene polymers as main constituents in a mixing ratio of 5.0:1 under pressure into said filler space against the biasing force of said concrete panel.

4,714,508

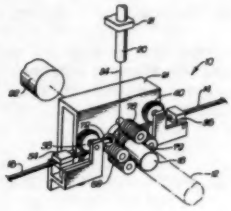
FIXTURE AND METHOD FOR MAKING SPIRAL WOUND HOSE

Donald R. Chivens, Northridge, and Paul Greskovics, Manhattan Beach, both of Calif., assignors to Alopex Industries, Inc., San Marcos, Calif.

Filed Mar. 25, 1986, Ser. No. 843,509

Int. Cl.⁴ B23K *27/00*

U.S. Cl. 156—195 **8 Claims**



1. A method of making spiral wound hose, comprising the steps of:

spirally winding an inner strip of thermoplastic material onto a mandrel, the inner strip having a generally U-shaped geometry defined by a central web joined at opposite ends to a pair of generally parallel ribs, said inner strip winding step comprising winding the strip in a radially outwardly open orientation with the ribs of adjacent spiral turns in generally abutting back-to-back relation;

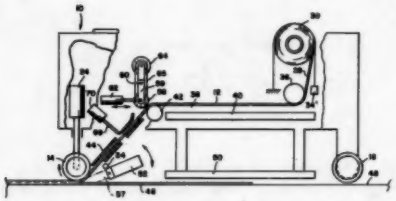
spirally winding an outer strip of thermoplastic material onto the mandrel over the inner strip, the outer strip having an outboard wall joined at its opposite ends to a pair of generally parallel legs, said outer strip winding step comprising winding the outer strip in a radially inwardly open orientation with the outboard wall overlying adjacent ribs of adjacent spiral turns of the inner strip and with the legs disposed in axially outboard positions relative to said adjacent ribs; and

laser welding the inner and outer strips together along a continuous line of contact at the juncture of the outboard wall of the outer strip and the underlying adjacent ribs of the inner strip to form the spiral wound hose.

4,714,509
METHOD AND APPARATUS FOR LAYING DOWN TAPES

Mark B. Gruber, New Castle, Del., assignor to E. I. DuPont De Nemours and Company, Wilmington, Del.

Filed Jul. 2, 1984, Ser. No. 626,907
Int. Cl.[4] B32B *31/26*
U.S. Cl. 156—272.2 4 Claims



1. A method of building and consolidating a composite structure from a fiber-reinforced, thermoplastic, polymeric tape, said method comprising the steps of

advancing successive lengths of tape toward and at an angle to a work surface,

pressing the advancing length on the preceding length, with a consolidating force, during relative movement between the two lengths, and

directing a beam of high temperature, radiant energy at and across the nip between the advancing and preceding lengths of tape, with the center of the beam on the structure,

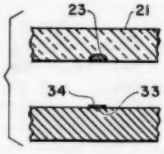
heating the mating surfaces of the matrices to the melting point substantially simultaneously through 5–20% of the thickness of each tape by directing a major portion of the radiant energy at the preceding length on the building structure and the rest of the radiant energy at the advancing tape,

the speed of relative movement and the temperature of the radiant energy interrelated to heat, fuse and join the thermoplastic, polymeric matrices at the mating surfaces of the tapes being consolidated.

4,714,510
METHOD OF BONDING PROTECTIVE COVERS ONTO SOLAR CELLS

James F. Holt, Medway, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 25, 1986, Ser. No. 900,055
Int. Cl.[4] C03C *27/02, 27/10;* H01L *31/00, 31/18*
U.S. Cl. 437—2 7 Claims



1. A method for bonding a protective cover to a solar cell having on an active surface thereof at least one area including the photovoltaic junction of said solar cell and a metallic gridwork defining said at least one area and providing an electrical contact for said solar cell, said method comprising the steps of:

(a) providing a substrate;

(b) depositing onto said substrate said metallic gridwork of said solar cell;

(c) overlaying said cover in contact with said metallic gridwork on said substrate;

(d) heating said cover, metallic gridwork and substrate under pressure to impress said metallic gridwork into the surface of said cover contacting said metallic gridwork;

(e) removing said cover and metallic gridwork from said substrate;

(f) applying a thin metallic adherent layer on said solar cell in configuration corresponding to that of said metallic gridwork of said solar cell;

(g) applying a metallic compatibility layer to said solar cell over said metallic adherent layer in substantially identical configuration thereto;

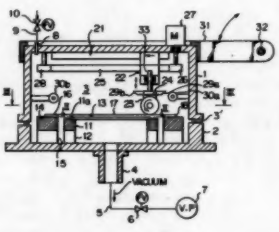
(h) overlaying said cover and metallic gridwork onto said solar cell with said metallic gridwork in registration with said metallic compatibility layer; and

(i) bonding said metallic gridwork to said metallic compatibility layer where said cover is protectively attached to said solar cell.

4,714,511
METHOD AND APPARATUS FOR ADHERING A TAPE OR SHEET TO A SEMICONDUCTOR WAFER

Kunimichi Nakao, Yokohama, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Feb. 25, 1986, Ser. No. 833,308
Claims priority, application Japan, Feb. 27, 1985, 60-39996
Int. Cl.[4] B32B *31/20*
U.S. Cl. 156—285 12 Claims



1. An apparatus for adhering a tape or sheet material having an adhesive back surface to a back surface of a substantially disk-shaped semiconductor wafer having a front surfce with an electric pattern being formed thereon, said apparatus comprising:

a housing having a vacuum working chamber therein;

a table provided in said working chamber and having a cylindrical supporting section for horizontally supporting the semiconductor wafer thereupon in a manner such that only a peripheral portion of said front surface of said semiconductor wafer is in contact therewith;

means for provided in said working chamber for holding said tape or sheet material at a predetermined position such that said adhesive back surface of said tape or sheet material is located to said back surface of said semiconductor wafer and a predetermined clearance is maintained therebetween;

means for physically pressing said tape or sheet material against said semicondutor wafer in order to provisionally adhere them together along at least the periphery thereof using such slight pressure that said wafer will not be damaged; and

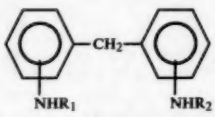
a valve means for regulating air pressure in said vacuum working chamber for successive complete adhering.

4,714,512
POLYURETHANE COATINGS AND ADHESIVES

David W. House, Arlington Heights, and Ray V. Scott, Jr., Addison, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 715,719, Mar. 25, 1985, Pat. No. 4,578,446. This application Jan. 23, 1986, Ser. No. 821,722
Int. Cl.[4] C09J 5/10
U.S. Cl. 156—306.6 38 Claims

1. A method of bonding two surfaces each of which is selected from the group consisting of rubber, plastics, wood, metal, fabrics, paper, and leather comprising placing between said surfaces of film of a polyurethane resulting from the reaction of an isocyanate terminated urethane prepolymer, said prepolymer being the adduct of from about 1.5 to about 4.0 equivalents of a polyisocyanate with 1 equivalent of a polyol, with from about 0.80 to about 1.2 equivalents of a secondary aromatic diamine as the sole curing agent of the structure,

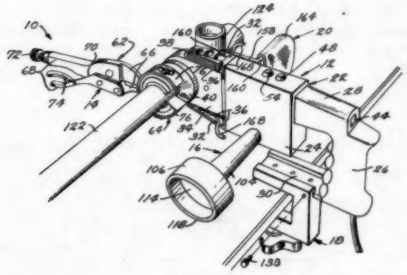


where each alkyl group, R_1 and R_2, contains from 4 to about 20 carbon atoms, pressing together said surfaces so that each surface is in contact with the film under pressure, heating the film to a temperature between 75° and 150° C. for a time sufficient to melt the film, and cooling the film while maintaining the surfaces under pressure for a time sufficient to achieve adhesion.

4,714,513
APPARATUS FOR FUSHION WELDING PLASTIC PIPE JOINTS

Roy E. McAlister, 5285 N. Red Rock Dr., Phoenix, Ariz. 85018

Filed Apr. 9, 1984, Ser. No. 598,154
Int. Cl.[4] B29C 65/02, 65/18
U.S. Cl. 156—359 37 Claims



1. Apparatus for use in fusion welding joints in a plastic pipe system comprising:

a heating device including;

a housing providing a rearwardly disposed pistol grip handle,

a heating member having opposed sides facing in directions corresponding to opposed sides of said pistol grip handle,

means for securing said heating member in heat insulating relation to said housing in a forwardly extending position with respect to said pistol grip handle,

a secondary handle structure detachably fixedly secured to a side of said housing at one end thereof and extending outwardly therefrom,

depth gauge means on the outer end of said secondary handle for receiving the end of a plastic pipe and determining the depth to which said pipe end should be heated to fusion weld the same into a mating socket of a plastic fitting,

a clamping device operable to be clamped in rounding engagement with the exterior periphery of the plastic pipe at a position inwardly of the depth thereof determined by said depth gauge means,

a heatable socket member detachably fixedly secured to one side of said heating member for receiving in heat conducting relation therein a plastic pipe end up to the depth determined by the position of said clamping device thereon,

a heatable plug member detachably fixedly secured to the other side of said heating member for receiving in heat transmitting relation thereof a mating socket of a plastic fitting,

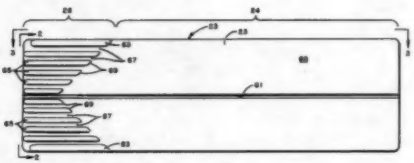
said heating device further including means for controllably heating said heating member so as to bring said heatable socket member and said heatable plug member to a desired temperature, and

timing signal means for providing signal means for enabling an operator to determine the time when the pipe end and mating socket should be removed from heat transmitting relation with the heated socket and plug members respectively.

4,714,514
BASEPLATE CONSTRUCTION FOR AN IRON USED TC FACE SEAM CARPET WITH HOT MELT ADHESIVE TAPE

Merle R. Hoopengardner, Lafayette, Calif., assignor to Orcon Corporation, Union City, Calif.

Filed Jun. 20, 1986, Ser. No. 876,838
Int. Cl.[4] B29C 65/20; D06F 75/38
U.S. Cl. 156—391 7 Claims



1. A carpet seaming iron of the kind used for making a face seam between two pieces of carpet by heating a layer of hot melt adhesive on a carpet seaming tape positioned beneath the carpet backings at the seam and extending along the length of the seam, said iron comprising,

baseplate means having a lower surface engageable with the hot melt adhesive layer on the tape for heating the hot melt adhesive to a molten condition as the iron is moved along the tape,

handle means for manually moving the iron along the tape and beneath the carpet backings at the seam,

surface means on the upper surface of the iron and engageable with the undersides of the carpet backings for progressively lifting the backings from the tape at the front of the iron, as the iron is moved along the tape, and then lowering the backings onto the layer of molten adhesive at the back of the iron,

groove means formed in the lower surface of the baseplate means and including a longitudinally extending, center groove having a length, depth, width, and alignment effective to form, in the layer of molten adhesive produced behind the moving iron, a raised center bead of a sufficient height and stiffness to coat the side edges of the carpet backings with hot melt adhesive as the undersides of the carpet backings are lowered onto the layer of molten adhesive and to thereby cause said side edges of the backings to be locked directly together through the adhesive interposed between said side edges, and

flat surface means at the forward part of the lower surface of the baseplate means having a sufficient length to heat the hot melt adhesive to a molten state and to therefore speed up the seaming process, said flat surface means including a flat surface which extends from the front of the baseplate over the first ¼ to ½ of the lower surface for providing good heating contact of that forward surface with the adhesive, and

wherein the rearward part of said lower surface has a ribbed surface formed with a number of longitudinally extending ribs projecting from the plane of said flat surface to meter the molten adhesive evenly over the full width of the tape and wherein the leading edges of the ribs are longitudinally offset so as to form a V shape construction for helping to funnel molten adhesive both into the channels between the ribs and into said center groove at the apex of the V as the iron is moved along the tape.

4,714,515

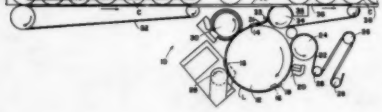
STRAIGHT LINE CONTAINER LABELING APPARATUS

Wolfgang W. Hoffmann, Modesto, Calif., assignor to Shibuya America Corporation, Modesto, Calif.

Filed Sep. 22, 1986, Ser. No. 910,024

Int. Cl.⁴ B65C *3/12, 9/04, 9/34*

U.S. Cl. 156—450 **6 Claims**



1. Labeling apparatus comprising:

a main drive belt moving in one linear direction;

a labeling belt moving in the opposite linear direction;

said belts being generally parallel and spaced to engage diametrically opposite sides of a generally cylindrical container so that a container therebetween is rotated thereby;

said drive belt moving at a greater speed than that of said labeling belt so that a container therebetween is moved slowly in the direction of movement of said drive belt;

means for delivering containers between said belts at the upstream end of said drive belt; and

means for delivering gummed labels to the upstream end of said labeling belt.

4,714,516

METHOD TO PRODUCE VIA HOLES IN POLYMER DIELECTRICS FOR MULTIPLE ELECTRONIC CIRCUIT CHIP PACKAGING

Charles W. Eichelberger, Schenectady, and Robert J. Wojnarowski, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

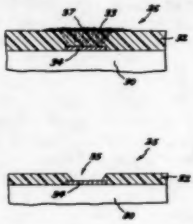
Filed Sep. 26, 1986, Ser. No. 912,455

Int. Cl.⁴ B44C *1/22;* **B29C** *37/00;* **C03C** *15/00, 25/06*

U.S. Cl. 156—628 **12 Claims**

1. A method for producing holes in a polymer film, said method comprising the steps of:

irradiating a spot on said film, where said hole is desired, with a burst of focused electromagnetic energy at a level sufficient to damage said film without substantial ablation of said film; and



plasma etching said irradiated film so as to remove said damaged film.

4,714,517

COPPER CLEANING AND PASSIVATING FOR TAPE AUTOMATED BONDING

Devi P. Malladi, Campbell; Ranjan Mathew, San Jose, and Divyesh P. Shah, Sunnyvale, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 8, 1986, Ser. No. 861,210

Int. Cl.⁴ C23F *1/00;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—629 **8 Claims**

1. In the process for cleaning and passivating copper parts that are to be employed for assembling semiconductor devices the steps of:

cleaning said copper parts in a strong caustic solution;

passivating said copper parts in an aqueous solution of a mild organic acid;

rinsing said copper parts in water;

drying said copper parts; and

thermocompression bonding said cleaned and passivated parts.

4,714,518

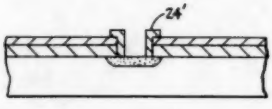
DUAL LAYER ENCAPSULATION COATING FOR III–V SEMICONDUCTOR COMPOUNDS

Arumugam Satyanarayan, Bradford, and Aland K. Chin, Sharon, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 14, 1987, Ser. No. 3,317

Int. Cl.⁴ B44C *1/22*

U.S. Cl. 156—635 **17 Claims**



10. A process for providing a metallized contact to a III-V compound semiconductor of the type having an encapsulation coating thereon consisting of a layer of silicon deposited on the III-V compound semiconductor at a deposition temperature not exceeding the congruent evaporation temperature of the III-V compound semiconductor, said silicon layer, in turn, being overlayed with a layer of silicon nitride, said process comprising:

defining select areas to etch on the outside surface of the silicon nitride layer by masking those areas on the outside surface of the silicon nitride layer not to be etched;

reactive ion etching the silicon nitride layer in the areas selectively defined for etching;

plasma etching the silicon layer in the areas selectively defined for etching;

electron beam evaporation titanium and gold in sequence to overlay the select areas of the III-V compound exposed by said etching; and

heating said titanium and gold to provide an alloy of titanium and gold.

4,714,519

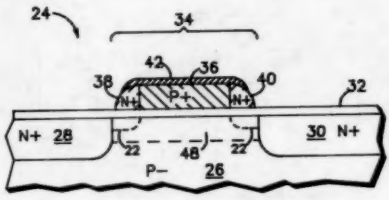
METHOD FOR FABRICATING MOS TRANSISTORS HAVING GATES WITH DIFFERENT WORK FUNCTIONS

James R. Pfiester, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 30, 1987, Ser. No. 31,304

Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 437—81 **11 Claims**



1. A process for fabricating an insulated gate field effect transistor (IGFET) comprising the steps of:

providing a semiconductor substrate;

forming a layer of gate dielectric material on the semiconductor substrate;

providing a doped semiconductor material gate region on the gate dielectric material, the gate region doped with an impurity of a first conductivity type;

forming a conformal layer of a doped semiconductor material over the gate region and the gate dielectric material layer, the conformal layer doped with an impurity of a second conductivity type; and

performing an anisotropic etch of the conformal layer of doped semiconductor material to leave sidewalls on the gate region, where the gate region forms a central portion of a gate and the sidewalls form end portions of the gate.

4,714,520

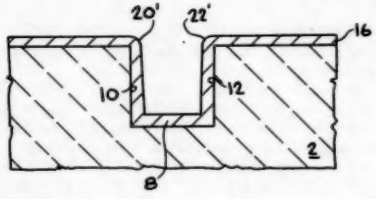
METHOD FOR FILLING A TRENCH IN AN INTEGRATED CIRCUIT STRUCTURE WITHOUT PRODUCING VOIDS

Peter S. Gwozdz, Cupertino, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jul. 25, 1985, Ser. No. 759,621

Int. Cl.[4] B23P *15/00;* **B44C** *1/22;* **B05D** *5/12*

U.S. Cl. 437—228 **18 Claims**



1. A process for filling a trench in an integrated circuit structure without forming a void in said trench which comprises:

(a) partially filling said trench with an etchable material;

(b) etching said material in said trench with an etchant capable of preferentially removing material on the sidewall of said trench adjacent the top of said trench at a rate faster than the rate of removal of material on the sidewall of said trench adjacent the bottom of said trench; and

(c) then filling the remainder of said trench with filler material; whereby said filler material subsequently deposited adjacent the top of said trench will not close off said trench prior to complete filling of the bottom of said trench with said filler material wherein said etchable material is deposited in said trench using a vapor deposition process; wherein said etching step comprises a vapor etch carried out at a temperature greater than 300° C. and a partial pressure of at least 1 Torr to provide a graduated etching of said sidewalls of said trench by said high partial pressure of said etchant, relative to the partial pressure of said deposition, which inhibits penetration of said etching into said trench.

4,714,521

TWIN WIRE FORMER WITH AN IMPERMEABLE BELT INSIDE THE TOP WIRE

Haruyoshi Fujiwara, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

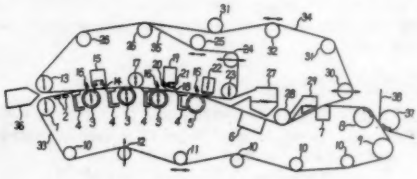
PCT No. PCT/JP85/00632, § 371 Date Jun. 25, 1986, § 102(e) Date Jun. 25, 1986, PCT Pub. No. WO86/02961, PCT Pub. Date May 22, 1986

PCT Filed Nov. 13, 1985, Ser. No. 882,978

Claims priority, application Japan, Nov. 15, 1984, 59-241475

Int. Cl.[4] D21F *9/02, 1/00*

U.S. Cl. 162—300 **1 Claim**



1. A twin wire former comprising:

a top endless wire loop adjacent a bottom wire endless loop and between which a dewatering section is defined;

a water impermeable belt disposed within said top endless wire loop, said belt travelling along the inner side of said top wire over a first portion of said dewatering section,

said top and said bottom wire loops and said belt being positioned so that dewatering occurs in said first portion of the dewatering section on only one side of the twin wire former through the bottom wire, and in a subsequent portion of the dewatering section through both the top and the bottom wires;

a plurality of adjustable rolls or adjustable shoes within said belt and said top wire and over which said belt travels in said first portion of the dewatering section; and

adjusting means for adjusting the positions of said rolls or said shoes for varying the relative wrapping angles of the belt and the wires.

4,714,522

DEVICE FOR DECELERATING FAST-FLOW CURRENTS OF WHITE WATER

Herbert Holik, Ravensburg, Fed. Rep. of Germany, assignor to Sulzer-Escher Wyss GmbH, Ravensburg, Fed. Rep. of Germany

Filed Jul. 23, 1986, Ser. No. 888,363

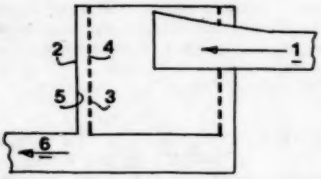
Claims priority, application Switzerland, Jul. 30, 1985, 03300/85

Int. Cl.[4] D21F *1/68*

U.S. Cl. 162—264 **9 Claims**

1. Paper making apparatus comprising a high speed paper

making machine having a base and in which is generated a fast-flowing current of white water; a stilling tower having a bounding wall and containing a screen cage spaced radially inward from said wall and including a curved inner wall; duct means at or above the elevation of the base of the paper making machine and in communication with the inside of the screen cage and structured for guiding white water out of said machine and causing it to flow along the curved inner wall of the screen cage at substantially its speed of generation, the screen



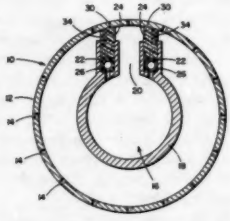
cage also including through openings which divide white water flowing along its inner wall into a multiplicity of individual jets which are directed radially to impinge upon, and thereby to be decelerated by, said bounding wall, said openings constructed so that the jets strike the bounding wall perpendicularly and do not flow obliquely to the bounding wall; and a channel connected with a lower region of the stilling tower for collecting and discharging white water which descends along the bounding wall following said impingement of the jets upon that wall.

4,714,523

SUCTION ROLL SEAL STRIPS WITH TEFLON INSERT

William D. Sawyer, Jr., and William D. Sawyer, Sr., both of 100 Enterprise St., West Monroe, La. 71291

Filed Dec. 18, 1986, Ser. No. 943,043
Int. Cl.[4] D21F 3/10
U.S. Cl. 162—371 **4 Claims**



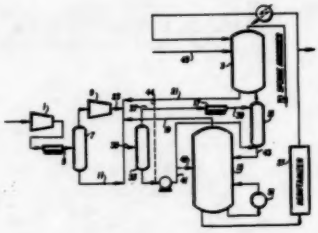
1. In a suction roll of a paper making machine having a rotatable perforated cylindrical shell and a vacuum box means disposed stationarily internally of the shell with said vacuum box including an edge structure defining a slot extending throughout the width of the suction roll in operative communication with said vacuum box, and sealing strips extending from said edge structure in the vacuum box and engaging the internal surface of the perforated shell for forming a seal so that vacuum induced in the vacuum box is associated with the internal surface of the perforated shell, each sealing strip comprising a body member of wear resistant material having an outer surface forming an interface with the internal surface of the shell, the improvement wherein each sealing strip further includes a lengthwise inlay strip of PTFE material exposed at said outer surface of the sealing strip for rubbing against the internal surface of the shell and smearing across said outer surface thereby providing reduced friction and improved lubrication at said interface.

4,714,524

APPARATUS FOR MINIMIZING RECYCLING IN AN UNSATURATED GAS PLANT

Mohsen N. Harandi, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 688,084, Dec. 31, 1984, Pat. No. 4,605,493.
This application Apr. 18, 1986, Ser. No. 853,517
Int. Cl.[4] C10G 7/02
U.S. Cl. 196—98 **4 Claims**



1. An unsaturated gas plant, comprising:

first means for receiving a low pressure gas and separating said low pressure gas into a liquid output and a gaseous output;

an absorber for receiving unstabilized gasoline and a lean hydrocarbon oil, and producing a gaseous overhead product and an absorber bottoms product therefrom;

a stripper for receiving and separating a liquid hydrocarbon input into a gaseous overhead product and a liquid bottoms product;

first conduit means interconnecting the first means, the absorber and the stripper for supplying an admixture comprising the liquid and gaseous outputs from said first means, said absorber bottoms product and the gaseous overhead product from said stripper to a high temperature separator for separating said admixture into a liquid hydrocarbon output and a gaseous output, said high temperature separator being connected to said stripper for conveying said liquid hydrocarbon output thereto and further connected to a condenser in series with a low temperature separator for conveying said gaseous output from said high temperature separator thereto for separating a condensed gaseous output from said condenser into a gaseous overhead product output and a liquid bottoms product, said low temperature separator being connected to said absorber for conveying said gaseous overhead product output thereto and further connected to said stripper for conveying said liquid bottoms product output thereto.

4,714,525

PROCESS FOR SEPARATING HIGH PURITY WATER

Jerome S. Spevack, New Rochelle, N.Y., assignor to Deuterium Corporation, Nev.

Continuation of Ser. No. 371,411, Apr. 23, 1982, which is a division of Ser. No. 111,229, Jan. 11, 1980, Pat. No. 4,331,513, which is a continuation of Ser. No. 823,677, Aug. 11, 1979, abandoned, which is a continuation of Ser. No. 590,071, Jun. 25, 1975, abandoned, which is a division of Ser. No. 497,451, Aug. 14, 1974, Pat. No. 4,008,046, which is a division of Ser. No. 126,623, Mar. 22, 1971, Pat. No. 3,872,223. This application Jan. 3, 1986, Ser. No. 815,783
Int. Cl.[4] C02F 1/04; C01B 5/02
U.S. Cl. 203—10 **8 Claims**

1. A process for separating essentially pure water enriched in deuterium from liquid water which contains dissolved contaminant matter, comprising:

(a) supplying said liquid water to the lower section of a closed vessel, said closed vessel comprising said lower

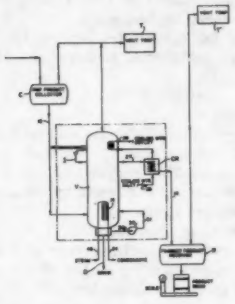
section, an upper section and an intermediate section communicating between said lower and upper sections,

(b) heating and vaporizing said water in said lower section,

(c) passing said vaporized water from step (b) upwardly in said intermediate section of said closed vessel,

(d) withdrawing from said intermediate section a portion of said vaporized water which has traversed the major part of said intermediate section,

(e) passing the other portion of said vaporized water upwardly through the remaining part of said intermediate section into said upper section,



(f) condensing vaporized water from step (e) in said upper section,

(g) passing all of the condensed water from said upper section to said lower section downwardly through said intermediate section to said lower section in countercurrent contact with the vaporized water passing therein,

(h) condensing vaporized water withdrawn in step (d), and

(i) collecting condensed essentially pure water enriched in deuterium from step (h) essentially free of said matter.

4,714,526

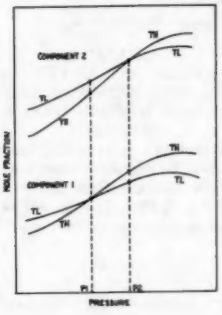
SUPERCRITICAL FLUID EXTRACTION METHOD FOR MULTI-COMPONENT SYSTEMS

Kenneth Pennisi, and Eldred Chimowitz, both of Rochester, N.Y., assignors to The University of Rochester, Rochester, N.Y.

Continuation of Ser. No. 743,339, Jun. 10, 1985, abandoned. This application Mar. 17, 1987, Ser. No. 26,603

Int. Cl.[4] B01D *3/34;* **C07C** *3/20, 51/44*

U.S. Cl. 203—49 **30 Claims**



1. A process for extracting n pure components from a multi-component system, where n is the number of components in the system, where each of said n components has a cross-over pressure point different from the other components thereby resulting in a range of cross-over pressure points from a highest cross-over pressure point through a next highest cross-over pressure point to lower cross-over pressure points, and where said cross-over pressure point for any n component comprises a pressure being defined on a plot of component solubility versus pressure where temperature isotherms for said component cross, which comprises the steps of

(1) passing a supercritical fluid through a first enclosed region, said region containing said multi-component system, at a first temperature sufficient to maintain the supercritical fluid in its supercritical state and at a pressure near a cross-over pressure point of any component present in said system thereby generating a fluid component mixture,

(2) passing said fluid-component mixture from said first enclosed region into a second enclosed region,

(3) changing said temperature to a second temperature in said second enclosed region to change the solubility of all components in said mixture having different cross-over pressure points causing said components to deposit in said second enclosed region,

(4) drawing off the remaining fluid-component mixture and passing said mixture into a third enclosed region,

(5) changing the temperature in said third enclosed region to said first temperature plus an incremental factor causing only the component present in said remaining mixture near the cross-over pressure point to deposit therein,

(6) drawing off the remaining fluid-component mixture, and

(7) repeating steps 1-5 on the components deposited in step 3 until all n components have been purified.

4,714,527

PROCESS FOR MEASURING THE POTENTIAL DIFFERENCE BETWEEN A SAMPLE LIQUID AND A REFERENCE ELECTROLYTE

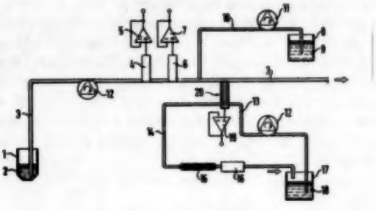
Gerhard Hofmeier; Karl Petersen, and Wolfgang Schroeder, all of Hamburg, Fed. Rep. of Germany, assignors to Eppendorf Geratebau Netheler + Hinz GmbH, Hamburg, Del.X

Filed May 8, 1986, Ser. No. 860,860

Claims priority, application Fed. Rep. of Germany, May 11, 1985, 3517131

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—1 T **4 Claims**



1. A process for measuring a potential difference between a flow of sample liquid delivered by pumping and a reference electrolyte, comprising the steps of:

providing an apparatus defining a channel for a sample liquid flow and comprising a reference electrode in contact with said sample flow, said electrode comprising a reference element and defining a capillary channel having a first and second end and extending transversely to said sample flow, said first end opening into said sample flow and said second end receiving reference electrolyte to be fed into said capillary channel;

pumping said sample flow transverse to said capillary channel through said sample flow channel; and

pumping a flow of reference electrolyte transverse to said capillary channel and over said second end before said potential difference is measured.

4,714,528

PROCESS FOR PRODUCING ALUMINUM SUPPORT FOR LITHOGRAPHIC PRINTING PLATE

Makoto Takeuchi; Etsuo Kitazumi; Hirokazu Sakaki, and Yoshio Okishi, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jul. 18, 1986, Ser. No. 886,625

Claims priority, application Japan, Jul. 26, 1985, 60-165545

Int. Cl.[4] C25F *3/04*; B24C *1/08*; C23F *1/02*

U.S. Cl. 204—33 16 Claims

1. A process for producing an aluminum support for a lithographic printing plate, which comprises roughening an aluminum plate surface by a liquid honing process to form a first grain thereon and then modifying the first grain by a brush graining process.

14. The process of claim 1, wherein the modified surface is anodized to form an anodic oxidation film thereon in an amount of 0.1 to 10 g/m^2.

4,714,529

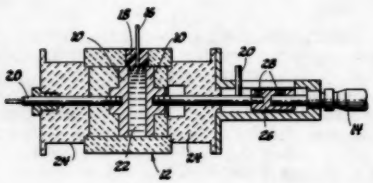
METHOD OF COATING METAL SURFACES IN OIL-BASED LUBRICANTS

Su-Chee S. Wang, Sterling Heights, and Simon C. Tung, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 16, 1985, Ser. No. 809,126

Int. Cl.[4] C25D *11/00*, *11/36*

U.S. Cl. 204—56.1 4 Claims



1. A method of forming a friction-reducing and wear-reducing film on the surface of a cast iron anode means spaced apart from a cathode means both immersed in an oil-based lubricant by an electrochemical process comprising the steps of blending an electrolytic additive of a dialkyl hydrogen phosphate into said oil-based lubricant such that sufficient electrical current may pass in said lubricant, passing an electrical current of sufficient current density between said anode and cathode means whereby a friction-reducing and wear-reducing film is formed substantially of iron phosphate on the surface of said anode means.

4,714,530

METHOD FOR PRODUCING HIGH PURITY QUATERNARY AMMONIUM HYDROXIDES

Cecil H. Hale; Alan R. Tanner, and Bryan M. Hale, all of Austin, Tex., assignors to Southwestern Analytical Chemicals, Inc., Austin, Tex.

Filed Jul. 11, 1986, Ser. No. 884,505

Int. Cl.[4] C25F *5/00*

U.S. Cl. 204—131 25 Claims

1. A process of improving the purity of quaternary ammonium hydroxides obtained by the electrolysis of the corresponding quaternary ammonium salt which comprises the steps of

(a) charging an aqueous solution containing the quaternary ammonium hydroxide to the anolyte compartment of an electrolysis cell which comprises an anolyte compartment and a catholyte compartment containing water separated from each other by a cation-exchange membrane,

(b) passing a direct current through the electrolysis cell to produce a high purity quaternary ammonium hydroxide in the catholyte compartment, and

(c) recovering the high purity quaternary ammonium hydroxide from the catholyte compartment.

4,714,531

PROCESS FOR COATING AN ELECTRICALLY CONDUCTIVE SUBSTRATE AND AN AQUEOUS COATING COMPOSITION BASED ON CATIONIC BINDER

Chantal H. Guioth, Rantigny; Etienne G. Maze, Breuil Le Vert, and Jean J. Trescol, Nogent Sur Oise, all of France, assignors to Akzo NV, Arnhem, Netherlands

Filed Jul. 7, 1986, Ser. No. 882,378

Claims priority, application Netherlands, Jul. 5, 1985, 8501938

Int. Cl.[4] C25D *13/06*

U.S. Cl. 204—181.7 17 Claims

1. A process for coating a substrate, comprising applying to said substrate an aqueous coating composition based on a cationic binder obtained by polymerization of a monomer mixture in the presence of 1–20 parts by weight of a polyethylenically unsaturated compound,

said monomer mixture consisting of (a) 1–30% by weight of a hydroxy(cyclo)alkyl (meth)acrylate of which the (cyclo)alkyl group contains 2–8 carbon atoms, (b) 4–45% by weight of an amino (meth)acrylate of the formula:

$$(R_1)_2NR_2OOC-\underset{\displaystyle R_3}{\overset{\displaystyle |}{C}}=CH_2$$

wherein at least one of the groups R_1 is a hydrocarbon group containing 1–12 carbon atoms and the other group R_1 is a hydrocarbon group containing 1–12 carbon atoms or a hydrogen atom, or the two groups R_1, together with the nitrogen atom attached thereto, form a heterocyclic group, R_2 is a hydrocarbon group containing 2–12 carbon atoms and R_3 is a hydrogen atom or a methyl group, (c) 0–80% by weight of a monovinyl aromatic hydrocarbon containing 8–14 carbon atoms, and (d) 0–15% by weight of a different monoethylenically unsaturated monomer containing 2–20 carbon atoms;

said polyethylenically unsaturated compound being an epoxy group-free of a bisphenol bisglycidyl ether and an ethylenically unsaturated amino amine formed from (a) a polyamine having 1–12 primary amino groups and 1–2 secondary amino groups and (b) an ethylenically unsaturated monocarboxylic acid having 18–24 carbon atoms;

amino groups present in said binder being at least partially neutralized with an acid.

4,714,532

PROCESS FOR COATING AN ELECTRICALLY CONDUCTIVE SUBSTRATE AND AN AQUEOUS COATING COMPOSITION BASED ON A CATIONIC BINDER

Chantal H. Guioth, Rantigny; Etienne G. Maze, Breuil Le Vert, and Jean J. Trescol, Nogent Sur Cloise, both of France, assignors to Akzo NV, Arnhem, Netherlands

Filed Jul. 7, 1986, Ser. No. 882,382

Claims priority, application Netherlands, Jul. 5, 1985, 8501936

Int. Cl.[4] C25D *13/06*

U.S. Cl. 204—181.7 16 Claims

1. A process for coating a substrate, comprising applying to said substrate an aqueous coating composition based on a cationic binder obtained by polymerization of a monomer mixture in the presence of 1–45 parts by weight of a polyethylenically unsaturated compound per 100 parts by weight of the monomer mixture,

said monomer mixture consisting of (a) 1–30% by weight of

a hydroxy(cyclo)alkyl(meth)acrylate of which the cyclo(alkyl) group contains 2–8 carbon atoms, (b) 4–45% by weight of an amino(meth)acrylate of the formula:

$$(R_1)_2NR_2OOC-\underset{\displaystyle R_3}{\overset{\displaystyle |}{C}}=CH_2$$

where at least one of the groups R_1 is a hydrocarbon group containing 1–12 carbon atoms and the other group R_1 is a hydrocarbon group containing 1–12 carbon atoms or a hydrogen atom, or the two groups R_1, together with the nitrogen atom attached thereto, form a heterocyclic group, R_2 is a hydrocarbon group containing 2–12 carbon atoms and R_3 is a hydrogen atom or a methyl group, (c) 0–80% by weight of a monovinyl aromatic hydrocarbon containing 8–14 carbon atoms, and (d) 0–50% by weight of a different monoethylenically unsaturated monomer containing 2–20 carbon atoms;

said polyethylenically unsaturated compound being a butadiene polymer built up of 70–100% by weight of 1,3-butadiene and 0–30% by weight of a copolymerizable monomer and having a number average molecular weight of 460–5400;

amino groups present in said binder being at least partially neutralized with an acid.

4,714,533

ELECTROLYSER FOR HIGHLY-ACTIVE TRITIATED WATER

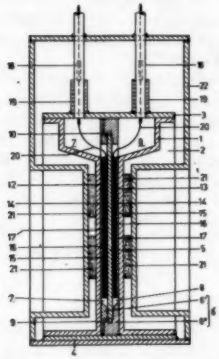
André Rahier, Soumagne; René D. W. Cornelissen, Mol, and Aimé Bruggeman, Retie, all of Belgium, assignors to Studiecentrum voor Kernenergie, S.C.K., Brussels, Belgium

Filed Apr. 18, 1986, Ser. No. 853,604

Claims priority, application Belgium, Apr. 25, 1985, 2/60672

Int. Cl.[4] C25B *9/00, 11/08, 13/04*

U.S. Cl. 204—262 **16 Claims**



1. An electrolyser for highly-active tritiated water, which electrolyser comprises a cell, which cell has:

a tightly-sealed cell housing,

an inorganic porous gas separator which has a porosity between 30 and 70%, and a pore diameter between 10 and 100 μm, and is gas impermeable when soaked-through with liquid, which separator divides said cell housing into two compartments,

two electrodes which are respectively mounted in said two compartments and which both lie in moistening contact with the gas separator, in such a way that when said latter separator is moistened, said electrodes are also moistened,

current-supply lines which connect to said electrodes,

two gas outlets which connect respectively to the two compartments, and

at least one liquid inlet which opens on the gas separator in such a way that said latter separator is moistened by capillarity with the liquid fed through the liquid inlet.

12. An electrolyser as defined in claim 1, which further comprises cooling means which are mounted in front of the electrodes, on the outer side of the cell housing.

4,714,534

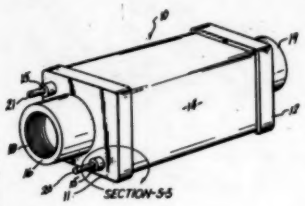
ELECTROLYTIC HALOGENATOR DEVICE

David L. Fair, Cheshire; Robert A. Dean, Guilford, both of Conn., and Arlon G. Sangster, Sterling, Mass., assignors to Olin Corporation, Cheshire, Conn.

Filed Jun. 20, 1986, Ser. No. 876,545

Int. Cl.[4] C25B *9/00, 11/02, 9/04*

U.S. Cl. 204—269 **12 Claims**



1. An electolytic cell for the production of hologen for use as a sanitizing agent in water, comprising in combination:

a. a plurality of generally planar electrode plates having a hologen evolving coating and assembled in interleaved fashion, the electrode plates further having two opposing substantially parallel sides, a first side being longer than a second side, and interconnected by an obliquely angled third side with respect to the two opposing substantially parallel sides and a fourth side, the plurality of electrode plates being assembled so that the first longer side of each electrode plate is alternately arranged with respect to the adjacent electrode plates on an oposing side;

b. a first bus bar and a second bus bar connectable to a source of electrical power external of the electrolytic cell connected to the plurality of generally planar electrode plates adjacent the intersection of the first longer side and the obliquely angled third side such that the first bus bar is connected to every other electrode plate and the second bus bar is connected to the remaining electrode plates;

c. a housing surrounding the plurality of electrode plates within which the plurality of electrode plates fit;

d. a plurality of electrode plate retaining means within the housing forming a plurality of grooves into which the two opposing parallel sides of the electrode plates fit to hold each electrode plate in place to maintain uniform spacing between the adjacent electrode plates;

e. an inlet end closure means with an inlet conduit to close the inlet end of the electolytic cell and to permit water to flow into the cell for electrolysis, the inlet end closure means further having a first cone-shaped orifice through which the first bus bar passes and a scond cone-shaped orifice through which the second bus bar passes;

f. an outlet end closure means with an outlet conduit to close the outlet end of the electrolytic cell and to permit water and halogen to flow out of the cell;

g. a first fixture and a second fixture connected to the housing through which pass the first bus bar and the second bus bar prior to exiting the cell; and

h. a first elastomeric seal fitting about the first bus bar and a second elastomeric seal fitting about the second bus bar, the first eleastomeric seal and the second elastomeric seal being compressed into the first and second cone-shaped orifices, respectively, by the pressure of the inlet end closure means transmitted through the first fixture and the

second fixture, respectively, to the first and second elastomeric seals to effect a liquid-tight seal at the first and second cone-shaped orifices.

4,714,535

MOLDED FRAMEWORK FOR ELECTROLESS AND ELECTROLYTIC PLATING RACKS

Robert L. Coombes, Jr., La Canada Flintridge; Merrill J. Owen, La Canada; Terance C. Colwell, West Covina, and Donald E. Walker, Upland, all of Calif., assignors to Crown City Plating Co., El Monte, Calif.

Filed May 22, 1986, Ser. No. 865,758

Int. Cl.[4] B05C *11/00, 11/16;* **C25D** *17/08;* **A47F** *5/08*

U.S. Cl. 204—297 W **28 Claims**

1. A product substrate assembly mountable on the framework of a plating rack comprising:

a runner system comprising at least one runner and means for releasably engaging the framework of the plating rack; and

at least one product substrate removably attached to the runner.

4,714,536

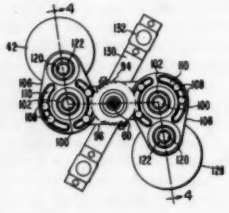
PLANAR MAGNETRON SPUTTERING DEVICE WITH COMBINED CIRCUMFERENTIAL AND RADIAL MOVEMENT OF MAGNETIC FIELDS

Kenneth F. Freeman, Mountain View; Charles B. Garrett, San Jose; David J. Harra, San Francisco, and Lawrence C. Lei, Mountain View, all of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 769,232, Aug. 26, 1985, abandoned. This application Mar. 31, 1987, Ser. No. 32,916

Int. Cl.[4] C23C *14/34*

U.S. Cl. 204—298 **32 Claims**



1. A crossed field sputtering device for sputtering material on a planar substrate:

a source of coating material having a target surface;

means for locating a planar substrate to be coated in a first position spaced from and facing said target surface;

means for establishing an electrical field in the space between said means for locating a substrate to be coated and said target surface;

magnetic means on the side of said source opposite said substrate locating means, said magnetic means forming a magnetic field in said space intersecting said electrical field; and

means for establishing relative lateral epicycloidal motion between said magnetic means and said target surface, said epicycloidal motion of said magnetic means occurring in a plane parallel to said target surface, said epicycloidal motion changing steadily with time, so that said magnetic means traverses a steadily changing area of said target surface whereby coating material is uniformly sputtered upon a surface of a substrate to be coated while said target surface is eroded relatively uniformly.

4,714,537

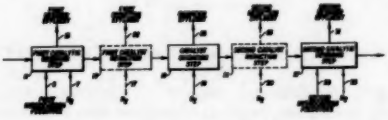
PROCESS FOR CYCLIC DEWAXING/REGENERATION OF HYDROCARBON FEEDSTOCKS

Diane V. Jorgensen, Wilmington; Clinton R. Kennedy, Talleyville, both of Del., and Stephen S. Wong, Medford, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 709,858, Jun. 8, 1985, abandoned. This application Jun. 11, 1986, Ser. No. 873,661

Int. Cl.[4] C10G *47/02, 23/90*

U.S. Cl. 208—111 **28 Claims**



1. A process for catalytically dewaxing a hydrocarbon feedstock comprising straight chain paraffins and slightly branched paraffins, comprising the following steps:

contacting said feedstock at isomerization conditions with a regenerated catalyst having isomerization activity and comprising a highly dispersed palladium-containing crystalline-silicate zeolite having the structure of Zeolite Beta to produce an effluent stream having a pour point less than that of said feedstock;

wherein said catalyst has been regenerated by an oxidation step comprising contacting said catalyst with an oxidizing stream consisting essentially of inert gas and 0.1 to 10 volume % oxygen, at a temperature between about 200° and about 540° C. and a pressure from atmospheric to 25,000 kPa at a contact time sufficient to substantially restore said isomerization activity of said catalyst.

4,714,538

TRIMETALLIC REFORMING CATALYST

Mark D. Moser, Hoffman Estates, and Randy J. Lawson, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 910,099, Sep. 22, 1986, Pat. No. 4,677,094. This application Apr. 10, 1987, Ser. No. 36,732

Int. Cl.[4] C10G *35/06*

U.S. Cl. 208—139 **5 Claims**

1. A process for the catalytic reforming of naphtha charge stock comprising contacting the naphtha and hydrogen at reforming conditions with a catalytic composite comprising a uniformly dispersed platinum component, a uniformly dispersed tin component, a surface-impregnated metal component selected from the group consisting of rhodium, ruthenium, cobalt, nickel, and mixtures thereof iridium and a halogen component on a refractory support having a nominal diameter of at least 650 microns.

4,714,539

REFORMING OF HYDROCARBONS UTILIZING A TRIMETALLIC CATALYST

Mark D. Moser, Hoffman Estates, and R. Joe Lawson, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 910,099, Sep. 22, 1986, Pat. No. 4,677,094. This application Apr. 10, 1987, Ser. No. 37,679

Int. Cl.[4] C10G *35/06*

U.S. Cl. 208—139 9 Claims

1. A hydrocarbon conversion process comprising reforming of naptha charge stock having a sulfur concentration less than 300 wt. ppb at reforming conditions with a catalytic composite comprising a uniformly dispersed platinum component, a uniformly dispersed tin component, a surface-impregnated metal component selected from the group consisting of rhodium, ruthenium, cobalt, nickel, iridium, and mixtures thereof and a halogen component on a refractory support having a nominal diameter of at least 650 microns.

4,714,540

REFORMING OF HYDROCARBONS UTILIZING A TRIMETALLIC CATALYST

Mark D. Moser, Hoffman Estates, and R. Joe Lawson, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 910,099, Sep. 22, 1986, Pat. No. 4,677,094. This application Apr. 13, 1987, Ser. No. 37,750

Int. Cl.[4] C10G *35/06*

U.S. Cl. 208—139 7 Claims

1. A hydrocarbon conversion process comprising reforming of naphtha charge stock having a water concentration less than 50 wt. ppm at reforming conditions with a catalytic composite comprising a uniformly dispersed platinum component, a uniformly dispersed tin component, a surface-impregnated metal component selected from the group consisting of rhodium, ruthenium, cobalt, nickel, iridium, and mixtures thereof and a halogen component on a refractory support having a nominal diameter of at least 650 microns.

4,714,541

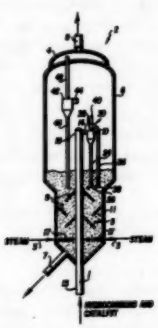
METHOD AND APPARATUS FOR IMPROVING CYCLONE EFFICIENCY

Frank M. Buyan, Yardley, Pa., and Mark S. Ross, Lawrenceville, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 22, 1985, Ser. No. 801,102

Int. Cl.[4] F27B *15/08*; C10G *35/14*

U.S. Cl. 208—161 33 Claims



1. An apparatus for separating solid catalyst particles from gases in a fluid catalytic cracking unit and returning the separated catalyst particles to a bed of particles below the apparatus which comprises

(i) a cyclone having a gas outlet tube through which a cyclone overhead stream comprising catalyst solids and gases pass in spiral flow.

(ii) a cylinder having an upstream end and a downstream end wherein said cylinder has smooth internal side walls and an inside diameter at least equal to the inside diameter of said cyclone gas outlet tube, said cylinder being axially aligned and in communication with said cyclone gas outlet tube and comprising sidewalls defining an opening;

(iii) a solids collector conduit tangentially attached to said sidewalls at the periphery of said opening;

(iv) a gas outlet conduit attached to said downstream end of said cylinder, said gas outlet conduit being axially aligned with said cylinder and;

(v) a solids discharge conduit attached to and extending downwards from the solids collector conduit for returning the collected solids to the bed of catalyst.

4,714,542

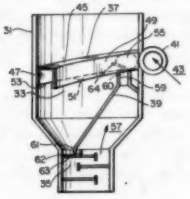
DISTILLATION VAPOR AND FEED MIXING PROCESS

William Lockett, Jr., Bernardsville, N.J., assignor to Encon Associates Inc., Bernardsville, N.J.

Filed Jan. 6, 1986, Ser. No. 816,416

Int. Cl.[4] B01D *3/30*

U.S. Cl. 208—347 10 Claims



1. In a distillation process wherein vaporizing liquid feed is being fed into a flash zone located within a column and contacted with rising vapors from the stripping section therein an improvement, for more complete mixing of the vaporizing liquid feed with the rising vapors from the stripping section in order to achieve a lower partial pressure effect on the feed to improve overall fractionation-energy efficiency, to minimize entrainment of heavy liquid droplets in vapors leaving the flash zone, and, to improve the flow of liquid on the top stripping tray, which improvement comprises:

(a) introducing the vaporizing liquid into the flash zone located within the column at an angle approximately tangential to the column via a nozzle and through a mixing and separation chamber having a port at its upstream end at the nozzle and an open downstream end at the flash zone, said chamber being constructed to approximately conform to the inside cross-sectional configuration of the column at the flash zone, and having side walls, a bottom and a top and having a rising vapors inlet port near the upstream end, said chamber having a length which is less than the full perimeter of the column at the flash zone;

(b) enhancing the efficiency of the contacting and mixing of all of the rising vapors with the vaporizing liquid feed by redirecting all of the rising vapors from the column into said chamber near its upstream end by physically partitioning at least a part of the column with a partition baffle located in the flash zone to direct the rising vapors to the rising vapors inlet of said chamber; and,

(c) further enhancing the efficiency of the contacting and mixing of all of the rising vapors with the vaporizing liquid feed by creating a spinning action with a deflector baffle located at said rising vapors inlet whereby high velocity feed inspirates all of the rising vapors so as to create the spinning action in said chamber and so as to thereby effect intimate mixing of all rising vapors from the stripping section with the vaporizing liquid feed.

4,714,543

METHOD OF TREATING BROWN COAL FOR LIQUEFACTION

Tetsuo Matsumura; Toshio Ohzawa; Akihiro Kawashima; Osamu Ohkuma; Saburo Sawada; Shun'ichi Yanai; Hiroshi Yoshimura, and Yasuo Sugino, all of Kobe, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe; Idemitsukosan Kabushiki Kaisha, Tokyo; Mitsubishikaseikogyo Kabushiki Kaisha, Tokyo and Aziasekiyu Kabushiki Kaisha, Tokyo, all of, Japan

Continuation of Ser. No. 548,852, Apr. 10, 1983, abandoned.
This application Feb. 4, 1986, Ser. No. 825,990
Int. Cl.[4] C10G *1/00, 1/06*
U.S. Cl. 208—412 3 Claims

1. A process for the liquefaction of brown coal, which comprises:

(a) increasing the temperature of a brown coal slurry in a solvent to 250° to 400° C. under pressure;

(b) dewatering said brown coal slurry as the temperature of the coal slurry increases in step (a) by the application of steam which is obtained from a gas-liquid phase separation step;

(c) preheating said dewatered brown coal slurry and hydrogen gas in a preheater;

(d) feeding the heated slurry and hydrogen to at least four hydrogenation reactor towers connected in series where hydrogenation of the brown coal is conducted and in which high concentration metal salt-containing slurries form;

(e) withdrawing said salt-containing slurries from the bases of at least first two hydrogenation reactor towers and passing said slurries to at least two high pressure settling vessels connected in series in which a high solids content slurry and a low solids content slurry, as a supernatant, form;

(f) recovering said low solids contents slurry and recycling this slurry to the first of said hydrogenation reactor towers;

(g) withdrawing all of the reaction mixture exiting the last of the hydrogenation reaction towers and passing the withdrawn reaction material to the first of a plurality of settling vessels connected in series in which the reaction mixture separates into relatively small amounts of high solids content slurry and supernatant material;

(h) distilling said supernatant material to recover liquefied coal material; and

(i) deashing the high solids content slurry withdrawn from said settling vessels.

4,714,544

PROCESS FOR DRESSING KAOLINITE BY FLOTATION

Wolfgang von Rybinski; Holger Tesmann, both of Duesseldorf, and Bohuslav Dobias, Regensburg, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Feb. 26, 1986, Ser. No. 834,072
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1985, 3506808
Int. Cl.[4] B03D *1/00*
U.S. Cl. 209—167 18 Claims

1. A process for the selective separation of kaolinite from feldspar by flotation in aqueous pulp comprising:

(a) suspending an ultrafine particle size mineral mixture comprising feldspar and kaolinite in water to form an aqueous pulp at a pH of from about 5 to 8;

(b) treating the aqueous pulp with a water-soluble salt of Al^{3+} or Fe^{3+} and a collector comprising an anionic surfactant, said collector and water-soluble salt being present in sufficient concentration to provide a kaolin float and a feldspar sink in step (c)

(c) subjecting the treated pulp to a flotation treatment to float kaolinite; and

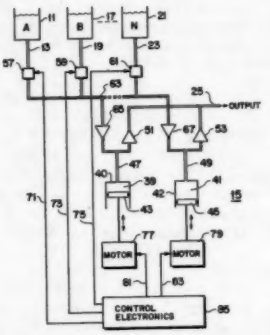
(d) recovering kaolinite from the resulting float and feldspar from the resulting flotation residue.

4,714,545

FLUID PROPORTIONING PUMP SYSTEM

H. Bryan Bente; Alan C. Herman, both of Half Moon Bay; Joel Myerson, Berkeley; Benjamin G. Shaw, Palo Alto, and Andrew Stefanski, Menlo Park, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 20, 1986, Ser. No. 841,922
Int. Cl.[4] B01D *15/08;* F04B *41/06*
U.S. Cl. 210—101 9 Claims



1. Apparatus for mixing and delivering fluid, comprising:

pumping means having at least two displacement chambers, including a first chamber and a second chamber, each chamber having a fluid intake and fluid output,

independent sources of at least two fluids, including a first source and a second source,

intake connecting means for connecting each of the fluid sources together to the fluid intakes of each of said chambers for providing a controllable proportion of said fluids from said sources to said intakes, said intake connecting means including means for connecting said first chamber to said first source and to said second source, said intake connecting means also including means for connecting said second chamber to said first source and to said second source,

output connecting means for connecting the outputs of the chambers together for forming a single fluid output, and

means connected to said displacement chambers for independently controlling the displacement in each of said chambers.

4,714,546

POTABLE WATER FILTER

Donald F. Solomon; Romona L. Solomon, and Charlie J. Good, all of Hemet, Calif., assignors to Newport Filters, Inc., Hemet, Calif.

Filed Feb. 10, 1986, Ser. No. 827,817
Int. Cl.[4] B01D *29/26*
U.S. Cl. 210—137 14 Claims

1. A potable water filter comprising:

a housing having an inlet and first and second outlets;

a tube in said housing and having a peripheral wall, a passage circumscribed by the peripheral wall and means forming an opening in the peripheral wall and leading to the passage whereby water from said inlet can flow in a direction having an axial component along the tube to the opening;

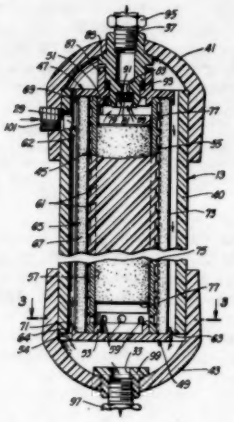
means including said housing and said tube for forming a first flow path between the inlet and the first outlet;

said passage being in essentially water tight communication with said second outlet whereby said inlet communicates with the second outlet through a second flow path which

includes a portion of the first flow path, the opening and the passage;

a particle filter element in the first flow path for filtering water flowing to said opening;

a second filter element in the second flow path downstream from the particle filter element for filtering water flowing



through the second opening, said second filter element having different water filtering characteristics from the particle filter element; and

said particle filter element being exposed to water flowing through the first flow path to the first outlet whereby the particle filter element is flushed by such flow to the first outlet.

4,714,547

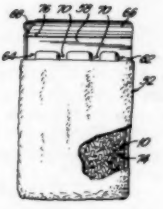
AQUARIUM TUBULES

Allan H. Willinger, Oakland, N.J., assignor to Willinger Bros., Inc., Oakland, N.J.

Filed May 5, 1986, Ser. No. 859,448

Int. Cl.⁴ A01K *63/04*

U.S. Cl. 210—169 **13 Claims**



1. In combination, an aquarium filter cartridge for use in aquarium filtering by placement in a flow path of a recirculating system of water from the aquarium and a plurality of tubules disposed within the cartridge, said cartridge comprising a frame member and a filter envelope, said filter envelope being formed of a filter material and having a front wall and a back wall and a closed bottom which is closed on three of the four perimeter edges, said frame being positioned within said envelope, said tubules formed of a biologically acceptable thermoplastic material, for supporting the propagation of organisms which are active in the biological filtration of aquarium water, to provide biological filtration within the filter cartridge, said tubules in conjunction with said frame member serving to retain said walls in spaced apart relationship such that aquarium water can flow into one wall, traverse said frame member, pass through the tubules and exit from the opposing wall, said tubules being disposed within the cartridge sufficiently to disperse the water traversing between the walls to provide a distribution of the water across substantially the entire opposing wall.

4,714,548

DEVICE FOR PURIFICATION OF WASTE WATER

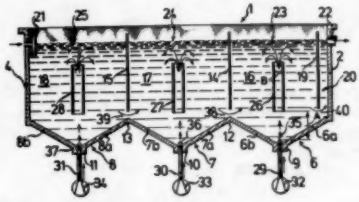
Engelbert Hoke, and Helgard Butterweck, both of Essen, Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Fed. Rep. of Germany

Filed Jun. 29, 1982, Ser. No. 393,355

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1981, 3126078

Int. Cl.⁴ C02F *1/74*

U.S. Cl. 210—221.2 **15 Claims**



1. A device for purification of waste water by oxidizing contaminating constituents in the water at normal pressure and at ambient temperature by oxygen containing gases or by oxygen in the presence of solid catalytic particles, comprising a reaction vessel for receiving a mixture of water-catalytic particles, said vessel having an open top side, lateral sides provided with feeding means for waste water and with discharging means for purified water at least one V-shaped bottom portion defining a downwardly projecting vertex; an air-feeding nozzle pipe arranged on said bottom portion in said vessel; and an uptake channel arranged in said vessel between said feeding an discharging means and at a spaced relationship to said bottom portion to provide an opening for said mixture of water-catalytic particles therebetween, the inlet of said uptake channel being situated above said air feeding nozzle pipe and the outlet of said uptake channel being below the surface of the treated water in said vessel to convey a three phase mixture of water-catalytic particles-air from the bottom portion toward said surface.

4,714,549

FILTERING CASE FOR SEPARATING A LIQUID FROM A SOLID, IN PARTICULAR FOR DEHYDRATING SLURRIES FROM INDUSTRIAL PROCESSES

Vincenzo Di Leo, Via Emilio Cecchi, 2, 20162 Milan, Italy

PCT No. PCT/EP86/00253, § 371 Date Dec. 18, 1986, § 102(e) Date Dec. 18, 1986, PCT Pub. No. WO86/06326, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 24, 1986, Ser. No. 2,658

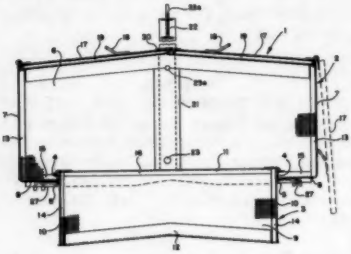
Claims priority, application Italy, Apr. 29, 1985, 20518 A/85; Jan. 7, 1986, 19016 A/86

Int. Cl.⁴ B01D *33/00, 35/28*

U.S. Cl. 210—224 **15 Claims**

1. A filtering case for civil and industrial slurries, having filter-forming rigid walls, characterized in that it comprises two superimposed parts, respectively an upper part (2,31) and a lower part (3,32), movable the one relatively to the other, the upper part (2,31) bounding a slurry receiver chamber (2*a*,61) and having a bottom wall (8,40*a*) wherein an opening (4,61) is provided, the lower part (3,32) being guided through said opening (4,61) between a first position outside said chamber (2*a*,51) and a second position at least partly inserted into said chamber (2*a*,51)

said lower part including means both for compressing and for providing filtration area which increases from said first



position to said second position, for slurry within said upper part.

4,714,550

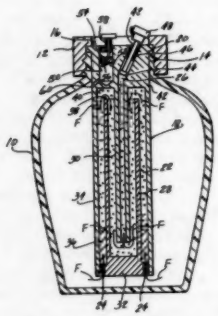
CANTEEN CARRIED WATER PURIFIER SYSTEM

William S. Malson, Warren, and John W. Sharpe, Ferndale, both of Mich., assignors to Water Systems Development Corporation, Fraser, Mich.

Filed Sep. 23, 1985, Ser. No. 779,275

Int. Cl.[4] B01D *29/08, 35/02*

U.S. Cl. 210—244 **2 Claims**



1. In a canteen including a hollow, watertight container having a neck at its upper end, and cap means detachably mounted on said neck;

the improvement comprising:

an elongate, tubular purifier assembly inserted into said container through said neck and a lip projecting radially outwardly from said assembly at its upper end and resting upon the top of said neck and sealingly clampable against said neck by said cap means when said cap means is mounted on said neck, said assembly having means defining an internal chamber having a top and bottom and substantially filled with particles of a water purifying material; fluid inlet means at the lower end of said assembly for establishing fluid communication between said chamber and the interior of said container; means at the upper end of said assembly defining a fluid outlet means from said chamber; means defining a restricted flow passage in said chamber directing the flow of fluid through said chamber from said inlet means to said outlet means including a first tube located within said chamber extending upwardly from the bottom of said chamber and having an open upper end adjacent to and spaced below the top of said chamber, a second tube projecting downwardly from the top of said chamber into said first tube and having an open lower end located adjacent to and spaced above the bottom of said first tube, and passage means at the upper end of said second tube placing the interior of said second tube in fluid communication with said outlet means to define a fluid passage of a length substantially greater than the length of said chamber; manually operable pump means in said assembly for pumping fluid in said container through said chamber to said outlet, said pump means comprising means defining a pump chamber in said assembly adjacent the upper end of said assembly, said pump chamber having means defining an outlet opening into the upper portion of the interior of said container when said lip is seated on said neck, and piston means manually reciprocable in said pump chamber for pumping air from said pump chamber into the interior of said chamber; and filter means mounted in the flow passage of said assembly for filtering fluid flowing into said chamber via said inlet means.

4,714,551

5/2-WAY COMMUTATING VALVE, PARTICULARLY FOR REVERSE-FLUSH FILTERS

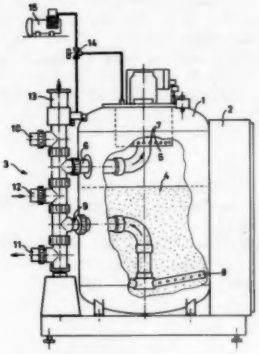
Bruno Bachhofer, Stäntisstrasse 85, 7981 Bavendorf, and Anton Locher, Bergstrasse 6, 7981 Torkenweiler, both of Fed. Rep. of Germany

Filed Jun. 4, 1985, Ser. No. 741,164

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1984, 3423424

Int. Cl.[4] B01D *23/24*

U.S. Cl. 210—278 **8 Claims**



1. A 5/2-way commutating valve comprising:

an elongate housing having a longitudinal axis, opposed ends, a hollow interior extending along the longitudinal axis between said ends and five connecting members spaced apart along the longitudinal axis and each having a flow passage communicating with said hollow interior and extending transversely of the longitudinal axis;

means defining a plurality of annular valve seats disposed in said hollow interior, with each said valve seat being located between a respective pair of connecting members;

a central rod located in, and extending along, said hollow interior and movable along the longitudinal axis of said housing;

spring means operatively associated with said central rod for urging said central rod in a selected direction along the longitudinal axis of said housing;

first and second valve elements each mounted on said central rod in the vicinity of a respective end of said housing and each located to form a sealing connection with a respective valve seat; and

a double-sided valve element carried by said central rod at a location between said first and second valve elements and movable with said central rod between respective posi-

tions to form, in each of the respective positions, a sealing connection with a respective one of two of said valve seats, said double-sided valve element being mounted to said central rod to have a limited mobility along the longitudinal axis relative to said central rod.

4,714,552

IN-LINE FLUID FILTERING DEVICES AND DISC-FILTERS USEFUL IN SUCH DEVICES

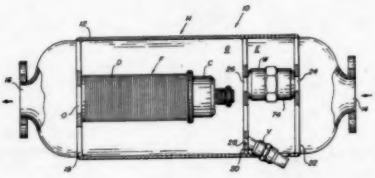
Elhanan Tabor, Carmiel, Israel, assignor to AR-KAL Plastics Products Beit Zera (1973), Israel

Filed Apr. 4, 1986, Ser. No. 848,313

Claims priority, application Israel, Jul. 24, 1985, 75896; Aug. 23, 1985, 76173

Int. Cl.[4] B01D *75/00*

U.S. Cl. 210—329 **16 Claims**



1. An in-line liquid filter device comprising:

(a) A housing having an inlet port at one side and an outlet port at another, opposite side thereof;

(b) a first compartment within the housing communicating with the outlet port;

(c) a filter installed within the first compartment, the filter comprises a stack of individual filter elements through which the liquid is adapted to pass from one side-surface to another side-surface thereof ("the filtering flow direction"), and reversely from the other side-surface to the one side-surface for flushing the filter elements ("the flushing flow direction");

(d) a second compartment within the housing communicating with the inlet port at one side and with the first compartment at another side thereof;

(e) a first valve within the second compartment for controlling the flow of the liquid from the inlet port to the first compartment;

(f) a second valve within the second compartment for controlling the flow of liquid from the first compartment to outside the housing;

(g) means for selectively closing the first valve; and

(h) means for feeding liquid to the filter while the first valve is closed so that the liquid flows through the filter elements in the flushing direction and drains by the second valve for enabling release of said elements from compact engagement sufficient to enable improved ringing by reverse flow flushing liquid.

4,714,553

TREATMENT OF CATALYST PARTICLES

Pierre Crouzet, Martigues, France, assignor to BP Chemicals Limited, London, England

Filed Jan. 12, 1987, Ser. No. 2,162

Claims priority, application France, Jan. 20, 1986, 86 00724

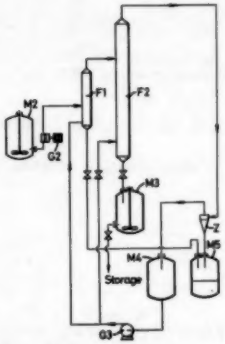
Int. Cl.[4] B01D *21/00*

U.S. Cl. 210—533 **3 Claims**

1. Apparatus comprising: means for the liquid elutriation of a solid Zielger-Natta type alpha-olefin polymerisation catalyst, consisting of at least one transition metal compound belonging to Groups IV, V or VI of the Periodic Table of Elements, and a magnesium compound, including

a tank M2 for the preliminary preparation of a catalyst suspension in the elutriation liquid and having means adapted to maintain uniformity of the suspension,

a vertical elutriation column F1 having a height H' and a diameter D' such that the ratio H'/D' is equal to or greater than 5, such column having: (a) a tube for the introduction of the catalyst suspension prepared in the tank M2 or of the catalyst suspension substantially freed from fine particles coming from the outlet of the top of column F2 as the case may be, at a level lying between H'/2 and the bottom of the column; (b) a tube for the introduction of the elutriation liquid at a level lower than that of the introduction of the catalyst suspension; (c) an outlet from the top of the column of a catalyst suspension substantially free from



large particles; and (d) an outlet from the bottom of the column of a catalyst suspension comprising mainly large particles, and/or vertical elutriation column F2 having a height H and a diameter D such that the ratio H/D is equal to or greater than 10 such column having: (a) a tube for the introduction of the catalyst suspension prepared in the tank M2 or of the catalyst suspension substantially free from large particles coming from the outlet at the top of the column F1, as the case may be, such tube being disposed at a level above H/2 and below 7 H/8; (b) a tube for the introduction of the elutriation liquid at a level lying below H/2; (c) an outlet from the top of the column of the catalyst particles substantially freed from fine particles.

4,714,554

CROSS-AXIS SYNCHRONOUS FLOW-THROUGH COIL PLANET CENTRIFUGE FREE OF ROTARY SEALS: APPARATUS AND METHOD FOR PERFORMING COUNTERCURRENT CHROMATOGRAPHY

Yoichiro Ito, Bethesda, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Oct. 3, 1986, Ser. No. 915,797

Int. Cl.[4] B01D *15/08*

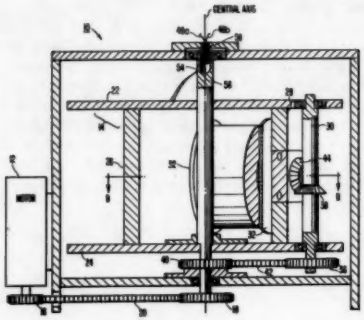
U.S. Cl. 210—635 **17 Claims**

12. A method of countercurrent chromatographic separation, comprising the steps of:

placing first and second immiscible fluid phases in a chromatographic column wrapped around a cylindrical column holder for rotation therewith, said chromatographic column having a head and a tail end and a central first longitudinal axis, said chromatographic column being fixed within a frame with respect to a second longitudinal axis positioned away from said column holder;

rotating said column holder about said central first longitudinal axis while simultaneously and synchronously revolving said column holder around said second longitudinal axis, positioned away from said column holder, in a manner such that the longitudinal axis of said column holder is

constantly tangent to and coplanar with a path defined by the revolution of said column holder around said second



longitudinal axis, whereby eluent is discharged at said tail or head end;

collecting said eluent discharged from said tail or head end.

4,714,555

AGENT FOR SEPARATION

Tohru Shibata, and Ichiro Okamoto, both of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 696,137, Jan. 29, 1985, abandoned. This application Mar. 11, 1987, Ser. No. 24,877

Claims priority, application Japan, Jan. 31, 1984, 59-15760

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—635 **12 Claims**

1. A method of separating, by chromatography, an optical isomer from a racemic modification containing the same, which comprises the step of flowing a solution of said racemic modification in contact with cellulose trinitrate as a chromatographic resolving agent.

4,714,556

BLOOD PURIFICATION

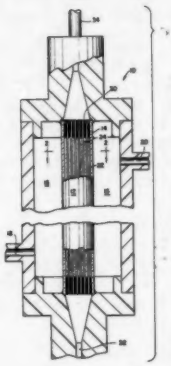
Clara M. Ambrus, 143 Windsor Ave., Buffalo, N.Y. 14209, and Csaba Horvath, 69 Pine Crest Rd., Orange, Conn. 06477

Continuation-in-part of Ser. No. 406,495, Aug. 9, 1982, abandoned, and Ser. No. 650,772, Sep. 13, 1984, Pat. No. 4,612,122, which is a continuation-in-part of Ser. No. 473,814, Jun. 29, 1981, abandoned, which is a continuation-in-part of Ser. No. 278,631, Jun. 29, 1981, abandoned. This application Mar. 13, 1985, Ser. No. 711,304

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—638 **18 Claims**

1. A process for removing antigens from blood fluid comprising the steps of (1) immobilizing a specific immunoreactive scavenging means for said antigen within a porous exterior surface of said membrane, (2) passing an antigen-bearing blood fluid along a retentive-barrier side of an anisotropic membrane the barrier layer of which will not allow passage of the blood cells, (3) assuring a unidirectional diffusion process is the only steady-state process for carrying any other blood components through said membrane by maintaining the porous side of said membrane in a closed container of constant volume, and (4) utilizing said scavenging means to maintain a concentration gradient of said antigen across said membrane and to achieve



an improved capture rate of said antigen by said immunoreactive scavenging means.

4,714,557

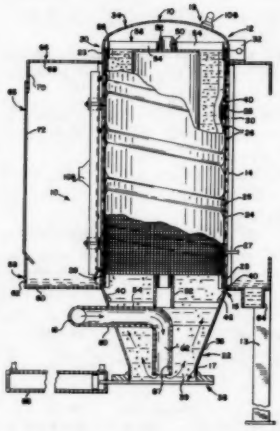
PRESSURE FILTER CAKE-BREAKING METHOD AND APPARATUS

Francis M. Croket, Farmington Hills, Mich., assignor to AMSTED Industries Incorporated, Chicago, Ill.

Filed Jun. 12, 1986, Ser. No. 873,361

Int. Cl.[4] B01D *29/14, 29/38*

U.S. Cl. 210—769 **10 Claims**



1. A method of filtering comprising the steps of

providing a vessel adapted to receive a liquid to be filtered,

providing an inlet for the liquid to be filtered near the bottom of the vessel,

providing a mesh screen so as to form an internal wall in the vessel,

providing a filter media overlaying the inner side of the mesh screen,

inletting liquid to be filtered into the vessel such that the liquid passes through the filter media and mesh screen,

introducing pressurized air into said vessel in contact with

the top of the liquid being filtered to force the liquid through the filter media and mesh screen,

ceasing the inletting of liquid to be filtered after a caking buildup of materials filtered from the liquid has occurred on the inner surface of the filter media, and

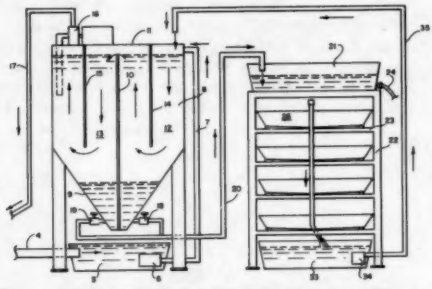
expanding a conduit helically wound between the filter media and the mesh screen to thereby break away the buildup of filtered materials from the filter media.

4,714,558

WASTEWATER TREATMENT SYSTEM

Tom D. Barbee, and James Ufheil, both of Louisville, Ky., assignors to The Barbee Co., Inc., Louisville, Ky.

Filed Apr. 2, 1986, Ser. No. 847,241
Int. Cl.[4] B01D *21/02, 23/02, 25/02*
U.S. Cl. 210—776 5 Claims



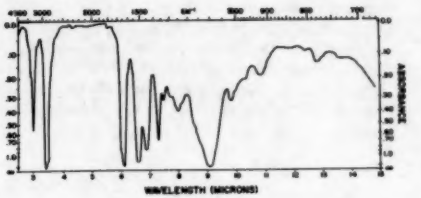
2. A wastewater treatment system for the effluent from a cleaning booth having a cleaning fluid inlet and a wastewater outlet, a feed pipe for delivering wastewater from the cleaning booth, a settling tray connected to said feed pipe for providing for removal of floating contaminates in the wastewater, a settling tank having a plurality of interconnected passageways therein, means connecting said settling tray with an inlet at the upper end of said settling tank, means for removing sludge from the lower end of said settling tank, a holding tank, means for delivering the sludge from the lower end of said settling tank to said holding tank, a plurality of filter trays, hose means for delivering the sludge from the holding tank to the plurality of filter trays, means for delivering the filtrate from said filter trays to the inlet at the upper end of said settling tank, and means for connecting the outlet of said settling tank to the inlet of said cleaning booth.

4,714,559

ANTISTATIC AGENTS WHICH ARE DIAMINES OF TRIALKYLACETIC ACIDS AND DIAMINES

Robert J. Steltenkamp, Somerset, and Michael A. Camara, Jackson, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 734,508, May 16, 1985, Pat. No. 4,619,775. This application Jul. 8, 1986, Ser. No. 883,193
Int. Cl.[4] D06M *3/30*
U.S. Cl. 252—8.8 2 Claims



1. An antistatic agent for filamentary and fibrous materials which is N,N'-ethylene-bis-neodecanoamide.

4,714,560

Patent Not Issued For This Number

4,714,561

ACYLATED ETHER AMINE AND LUBRICANTS AND FUELS CONTAINING THE SAME

Donald I. Hoke, Chagrin Falls, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Division of Ser. No. 560,254, Dec. 9, 1983, Pat. No. 4,581,038, which is a continuation of Ser. No. 298,449, Sep. 1, 1981, abandoned. This application Mar. 27, 1986, Ser. No. 844,903
The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.
Int. Cl.[4] C10M *133/56, 133/16*
U.S. Cl. 252—51.5 A 21 Claims

1. An additive composition for use in lubricants comprising the reaction product of a mixture of reactants comprising (A) an alkenyl substituted succinic acylating agent where the alkenyl substituent contains from about 8 to about 30 carbon atoms and (B) an ether amine of the general formula:

$$RO—CH_2)_nNH_2$$

where n is a number ranging from about 2 to about 4 and R is a straight-chain or branched-chain alkyl radical containing from about 8 to about 22 carbon atoms.

4,714,562

AUTOMATIC DISHWASHER DETERGENT COMPOSITION

Brian J. Roselle, Fairfield, and Dennis W. Weatherby, Franklin, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 6, 1987, Ser. No. 22,837
Int. Cl.[4] C11D *3/395, 3/40*
U.S. Cl. 252—94 20 Claims

1. A detergent composition comprising:

(1) from about 5% to about 90% by weight of detergency builder material on an anhydrous basis;

(2) chlorine bleach ingredient to provide from about 0.1% to about 5%, of available chlorine based on the weight of the detergent composition;

(3) from 0% to about 15% by weight of surfactant; and

(4) from 0.0005% to about 0.2% relatively water-soluble stilbene dye which is color-stable to chlorine bleach.

4,714,563

ANTIMICROBIAL TOILET BARS

Theresa M. Kajs, Maineville, and Cynthia A. Berge, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jul. 18, 1986, Ser. No. 888,305
Int. Cl.[4] C11D *1/50*
U.S. Cl. 252—107 7 Claims

1. An antimicrobial toilet bar comprising:

(a) from about 50% to about 90% of a surfactant selected from the group consisting of soaps and anionic synthetic surfactants and mixtures thereof; and

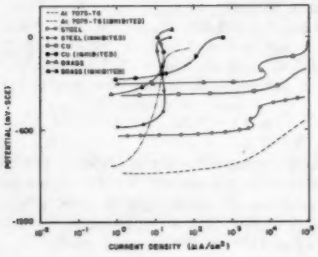
(b) from about 0.1% to about 10% of an antimicrobial agent selected from the group consisting of chlorhexidine and salts of chlorhexidine wherein said salts have a solubility in water at 20° C. of less than about 2.6% (w/v), said agent having a particle size of from about 1 to about 40 microns.

4,714,564

HIGH PERFORMANCE MULTIFUNCTIONAL CORROSION INHIBITORS ESPECIALLY FOR COMBINING AT 20 TO 50 WEIGHT PERCENT WITH SOAP OR PAINT

Charles T. Lynch, Fairborn; Fred W. Vahldiek, Dayton, and Mohammad Khobaib, Fairborn, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 21, 1982, Ser. No. 370,236
Int. Cl.[4] C11D *9/16*; C23F *11/06, 11/18*; C09K *3/00*
U.S. Cl. 252—110 4 Claims



1. A soap formulation comprising from 20 to 50 weight percent of a multifunctional corrosion inhibiting composition, said composition consisting essentially of the following components in the approximate concentrations indicated, in weight percent:

Component	Concentration
Alkali metal borate	68.0 to 70.0
Alkali metal nitrate	8.5 to 14.0
Alkali metal nitrite	13.5 to 17.5
Alkali metal metasilicate	0.5 to 1.7
Alkali metal phosphate	0.8 to 0.9
Mercaptobenzothiazole (MBT)	0.25 to 0.5
At least one selected surfactant and, optional, the following components:	1.05 to 2.0
Zinc sulfate	1.0 to 2.0
Benzotriazole (BT)	0.25 to 0.5

3. A paint formulation comprising from 20 to 50 weight percent of an encapsulated, dry multifunctional corrosion inhibiting composition, said composition consisting essentially of the following components in the approximate concentrations indicated, in weight percent:

Component	Concentration
Alkali metal borate	68.0 to 70.0
Alkali metal nitrate	8.5 to 14.0
Alkali metal nitrite	13.5 to 17.5
Alkali metal metasilicate	0.5 to 1.7
Alkali metal phosphate	0.8 to 0.9
Mercaptobenzothiazole (MBT)	0.25 to 0.5
At least one selected surfactant and, optional, the following components:	1.05 to 2.0
Zinc sulfate	1.0 to 2.0
Benzotriazole (BT)	0.25 to 0.5

4,714,565

HOMOGENEOUS CONCENTRATED LIQUID DETERGENT COMPOSITIONS CONTAINING A MONOESTER OF A DICARBOXYLIC ACID

Jean Wevers, Grimbergen; Christian R. Barrat, Brussels, both of Belgium, and Frederick E. Hardy, Newcastle upon Tyne, United Kingdom, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 25, 1986, Ser. No. 856,085
Claims priority, application United Kingdom, May 3, 1985, 8511305
Int. Cl.[4] C11D *1/83*
U.S. Cl. 252—174.19 9 Claims

1. A concentrated homogeneous liquid detergent composition containing:

(a) from 10% to 50% by weight of a mixture of anionic synthetic and nonionic surface-active agents;

(b) less than 50% by weight of water;

(c) from 2% to 50% by weight of a water-soluble monoester of a dicarboxylic acid selected from the group consisting of dodecanol succinate, tridecanol phthalate, tetradecanol phthalate, pentadecanol phthalate, hexadecanol phthalate, heptadecanol phthalate, and octadecanol phthalate,

(d) the non-ionic surface-active agent is present at a level of at least 5% by weight of the total composition; and

(e) said composition has a pH, in a 1% solution in water at 20° C., in the range of from 6 to 9 and said composition is free of cumene and xylene sulfonate hydrotropes.

4,714,566

PROCESS FOR PRODUCING W/O/W TYPE MULTIPLE EMUSION

Yasuyuki Takahashi; Shigeru Aizawa; Shigeru Tamai; Toshiro Yoshida, and Takeshi Takahashi, all of Tokyo, Japan, assignors to Meiji Milk Products Company Limited, Tokyo, Japan

Filed Aug. 3, 1984, Ser. No. 610,465
Claims priority, application Japan, Mar. 2, 1984, 59-038667
The portion of the term of this patent subsequent to Dec. 2, 2003, has been disclaimed.
Int. Cl.[4] B01J *13/00*; B01F *17/34*
U.S. Cl. 252—314 3 Claims

1. A process for producing a W/O/W type multiple emulsion which comprises adding, to water or an aqueous phase, an oil phase to which 1.0 to 10% of monoerucin or dierucin is added, mixing them to form an O/W emulsion, stirring the emulsion to effect phase inversion, adding the resulting W/O emulsion to an aqueous phase, and stirring them.

4,714,567

REACTING ALUMINA HYDRATE SOL AND AN ORGANIC MATERIAL TO FORM A STABLE MONOLITHIC GEL

Max E. Roha, Brecksville, Ohio, assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 31, 1985, Ser. No. 793,281
Int. Cl.[4] B01J *13/00*
U.S. Cl. 252—315.2 16 Claims

1. A method for preparing a stable monolithic gel comprising alumina hydrate combined with an organic material, said method comprising

(a) preparing a sol comprising a colloidal dispersion of alumina hydrate in an aqueous solution,

(b) mixing said sol and an organic reactant selected from the group consisting of polycarboxylic acids having esterified acid groups and anhydrides of polycarboxylic acids, and

(c) reacting said alumina hydrate with said organic reactant, thereby to form a monolithic gel comprising alumina hydrate chemically combined with an organic material.

4,714,568

NEW BLOWING AGENT COMBINATION BASED ON AZODICARBONAMIDE, PRODUCTION THEREOF AND USE THEREOF FOR FOAMING POLYMERS

Helmut Hurnik, Leverkusen; Manfred Finzenhagen, Cologne, and Werner Jeblick, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 486,070, Apr. 18, 1983, abandoned. This application Oct. 23, 1984, Ser. No. 663,896
Claims priority, application Fed. Rep. of Germany, Apr. 28, 1982, 3215835; European Pat. Off., Apr. 14, 1983, 83 103 589.4; Japan, Apr. 25, 1983, 58-71547; Canada, Apr. 26, 1983, 426758; Spain, Apr. 27, 1983, 521885
Int. Cl.[4] C09K *3/00*
U.S. Cl. 252—350 6 Claims

1. Blowing agent combination for a free foaming process consisting essentially of azodicarbonamide doped with one or more surface-active agents in an amount of about 0.0001 to 2% by weight of azodicarbonamide and one or more metal compounds in an amount of about 0.0001 to 2% by weight of azodicarbonamide.

4,714,569

PROCESS FOR PREPARING CONDUCTIVE COATING COMPOSITION

Hiroshi Nishino, Yokohama, and Kazuo Okabe, Warabi, both of Japan, assignors to Toska Co., Ltd., Tokyo, Japan

Filed Jul. 22, 1986, Ser. No. 888,196
Int. Cl.[4] H01B *1/06*
U.S. Cl. 252—511 6 Claims

1. A process for preparing a conductive coating composition, comprising the steps of:

(a) reacting (i) a mixture of graphite and carbon black, the ratio of graphite to carbon black being 2.5 to 0.8:1 by weight, with (ii) a mixture of a vinyl monomer having a functional group, the functional group being a member selected from the group consisting of a carboxy, an amino, a hydroxy and an acid anhydride group, and a comonomer, the ratio of the vinyl monomer - comonomer mixture to the graphite - carbon black mixture being 0.7 to 1:1, in the presence of a peroxide catalyst, to form a graft copolymer on the sufaces of said graphite and said carbon black;

(b) adding to the reaction mixture an azo compound having the capacity to substantially complete polymerization; and

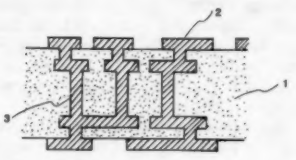
(c) adding to the product formed in (b) a curing agent which reacts with the functional group of said vinyl monomer to produce a network structure inside the product.

4,714,570

CONDUCTOR PASTE AND METHOD OF MANUFACTURING A MULTILAYERED CERAMIC BODY USING THE PASTE

Seiichi Nakatani, Neyagawa; Satoru Yuhaku, Osaka; Hideyuki Okinaka, Toyonaka; Toru Ishida; Osamu Makino, both of Hirakata, and Tatsuro Kikuchi, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 17, 1985, Ser. No. 756,081
Claims priority, application Japan, Jul. 17, 1984, 59-147832; Jul. 17, 1984, 59-147833; Sep. 6, 1984, 59-186777; Sep. 6, 1984, 59-186775; Feb. 8, 1985, 60-23846; Feb. 8, 1985, 60-23845; Feb. 8, 1985, 60-23844
Int. Cl.[4] H01B *1/06*
U.S. Cl. 252—518 6 Claims



1. A conductor paste comprising: an inorganic component comprising CuO powder at 85 to 98 wt % and at least one of Bi_2O_3, CdO, MnO_2 and Al_2O_3 at 2 to 15 wt %; an organic binder; and a solvent for the binder.

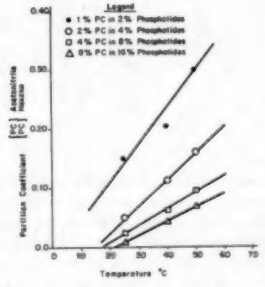
4. A conductor paste comprising: an inorganic component comprising a powder of one of NiO, Fe_2O_3 and CoO, at 85 to 98 wt % and at least one of Bi_2O_3, CdO, MnO_2, Al_2O_3, and CuO, at 2 to 15 wt%; an organic binder; and a solvent for the binder.

4,714,571

PROCESS FOR PURIFICATION OF PHOSPHOLIPIDS

Paul A. Tremblay, Mercerville, and John J. Kearns, Princeton, both of N.J., assignors to The Liposome Company, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 579,535, Feb. 13, 1984, abandoned. This application Feb. 6, 1985, Ser. No. 698,668
Int. Cl.[4] C11C *1/00*
U.S. Cl. 260—403 44 Claims



1. A process for purifying individual phospholipids from mixtures thereof, which comprises separating phosphatidylcholines from the phospholipid mixtures by non-chromatographic extraction with acetonitrile.

4,714,572

METHOD FOR THE MANUFACTURE OF COMPOSITE EXPLOSIVES

Sigurd Back, and Jan-Olof Nyqvist, both of Karlskoga, Sweden, assignors to Nobel Kemi AB, Karlskoga, Sweden

Filed Sep. 26, 1986, Ser. No. 911,699
Claims priority, application Sweden, Sep. 27, 1985, 8504469
Int. Cl.[4] C06B 21/00
U.S. Cl. 264—3.4 19 Claims

1. A two-stage wet granulation method for producing a composite explosive whose major components are hexogen or octogen, and trinitrotoluene, aluminum powder, and phlegmatization wax wherein said aluminum powder is in the form of pure, untreated powder which comprises suspending in water a first wet granulation stage, said hexogen or octogen, and said phlegmatization wax;

adding thereto a primary portion of said trinitrotoluene in the molten state or under such temperature conditions that said trinitrotoluene melts, the amount of said primary portion of said trinitrotoluene is such as to give homogeneous and uniformly-sized granules with the ingredients suspended in water;

cooling said primary portion of said trinitrotoluene to thereby form primary granules with the other components suspended in water;

mixing said aluminum powder in the form of pure, untreated powder into the remaining secondary portion of said trinitrotoluene in the molten state to form a homogeneous mixture; and

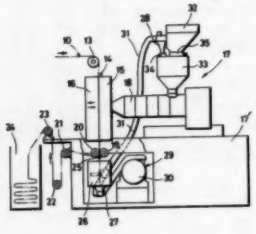
adding said homogeneous mixture in a second wet granulation stage to the granules suspended in the water to thereby form secondary granules.

4,714,573

METHOD OF MANUFACTURING MOLDED SLIDE FASTENER COUPLING ELEMENTS

Hiroshi Yoshida, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Division of Ser. No. 671,313, Nov. 14, 1984, Pat. No. 4,659,301.
This application Aug. 28, 1986, Ser. No. 901,362
Claims priority, application Japan, Nov. 15, 1983, 58-214828; Dec. 29, 1983, 58-245936
The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.
Int. Cl.[4] B29B 17/02; B29D 5/00
U.S. Cl. 264—37 2 Claims



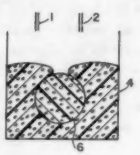
1. In the manufacture of a slide fastener chain having molded thereon rows of coupling elements made of a thermoplastic material, a process which comprises the steps of: cutting and removing runners and sprues from the rows of coupling elements immediately after the fastener chain has been withdrawn from a mold; pelletizing the runners and sprues to a predetermined particle size; recycling the thus pelletized material for re-use in combination with a fresh supply of thermoplastic chips; and controllng a supply of the pellitized material and the fresh supply of thermoplastic chips to fall within a predetermined ratio.

4,714,574

PROCESS FOR MAKING POLYURETHANE FOAM

Rudolf J. Tenhagen, Longirod, Switzerland, assignor to BP Chemicals Limited, London, England

PCT No. PCT/GB82/00185, § 371 Date Feb. 9, 1983, § 102(e) Date Feb. 9, 1983, PCT Pub. No. WO83/00117, PCT Pub. Date Jan. 20, 1983
PCT Filed Jun. 24, 1982, Ser. No. 468,058
Claims priority, application United Kingdom, Jun. 27, 1981, 8119908
Int. Cl.[4] B29C 67/22
U.S. Cl. 264—45.1 17 Claims



1. A process for the production of a flexible polyurethane foam article with regions of different hardness, which process comprises introducing into a mould a first foam formulation and a second foam formulation, the two formulations giving foam of different hardness and prepared by mixing together a polyol stream and an isocyanate stream in a mixer

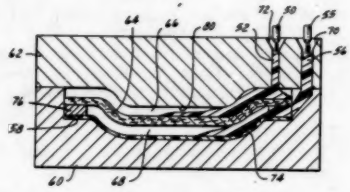
characterised in that the process comprises first introducing the first formulation to give a relatively soft foam and then introducing the second formulation to give a relatively hard foam, the second foam formulation being introduced directly on to the first formulation, at a time corresponding to a volume expansion of the first foam formulation in the range +100% to +2300% so as to form one or more relatively hard regions embedded within and surrounded by the relatively soft foam.

4,714,575

METHOD FOR MANUFACTURING RIM COMPOSITES

Frank J. Preston, Hampton, N.H., assignor to Ex-Cell-O Corporation, Walled Lake, Mich.

Filed May 27, 1986, Ser. No. 867,162
Int. Cl.[4] B29C 67/22, 45/14
U.S. Cl. 264—46.4 4 Claims



1. In a method of manufacturing a composite RIM article, by use of a RIM mold with a female body including a cavity therein separated by a divider to divide the cavity into lower and upper air-filled spaces which are filled respectively with a low viscosity RIM mixture and a high viscosity RIM mixture by simultaneously injecting the respective mixtures as separate streams into one or the other of the lower and upper air-filled spaces in an amount to fill such spaces, the improvement comprising: preforming the divider from glass fibers to form open pores throughout the divider; filling one space receiving the high viscosity material at a rate which prevents it from passing into the pores of the glass fibers; and filling the other space at a rate which permits the low viscosity material to penetrate

and fill the pores of the glass fibers without passing into the one space to prevent significant amounts of the low viscosity material mixing with the high viscosity material; and reacting the RIM materials in the mold to concurrently form a high strength armature in the space receiving the low viscosity material, a foam cover in the other space and a high strength interface boundary therebetween.

4,714,576

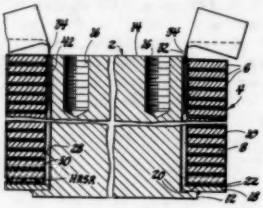
METHOD OF MANUFACTURING A POLYPHENYLENE SULFIDE POTTED POLE AND COIL ASSEMBLY

Dale L. Cotton, LaGrange, and Frank J. Nachman, Downers Grove, both of Ill., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 808,671, Dec. 16, 1985, abandoned, which is a continuation of Ser. No. 550,749, Nov. 10, 1983, abandoned. This application Jun. 2, 1986, Ser. No. 869,586

Int. Cl.[4] B29C *67/22, 39/10*

U.S. Cl. 264—46.5 **17 Claims**



1. In the process of making a pole and coil assembly for a dynamo-electric machine including the principal steps of positioning said coil about said pole so as to provide a space therebetween defined primarily by the inside surface of said coil and the outside surface of said pole and filling said space with dielectric insulation the improvement comprising:

a. providing said coil surface with an adherent, substantially imperforate coating of polyphenylene sulfide;

b. substantially filling said space with a foamable insulation in its solid state, said foamable insulation comprising a molding grade polyphenylene sulfide and a thermally activated blowing agent therefor;

c. sealing off said space to substantially contain said foamable insulation during subsequent heating of said assembly;

d. heating said assembly to melt said polyphenylene sulfide insulation and to activate said blowing agent for foaming said insulation within the confines of said space, said heating being sufficient to bond said foam to said coating and said pole and to so swell said polyphenylene sulfide insulation that the swollen polyphenylene sulfide insulation substantially completely fills said space and constrictively engages said pole;

e. solidifying said foamed insulation in substantially its swollen state.

4,714,577

METHOD FOR PRODUCING A WOOD-TYPE GOLF CLUB HEAD

Itsushi Nagamoto; Tatsuo Nakanishi, and Ryohei Tajima, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Sep. 11, 1986, Ser. No. 905,952

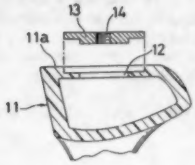
Claims priority, application Japan, Dec. 20, 1985, 60-287193

Int. Cl.[4] B29C *67/00*

U.S. Cl. 264—46.6 **14 Claims**

1. An improved method for producing a wood-type golf club head comprising the steps of

setting a lid having a threaded hole to a bottom seat hole in a hollow crude shell of a crude golf club head,



filling crude foamable synthetic resin of a prescribed amount with metal pieces into the interior of said hollow crude shell via said threaded hole in said lid, and

heating said crude golf club head for foaming.

4,714,578

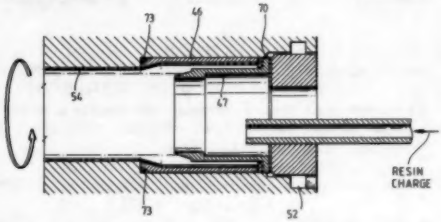
MOLDING OF INTEGRAL SOCKET CONNECTION IN CENTRIFUGALLY CAST FIBERGLASS REINFORCED PIPE

Larry L. Cagle; Keith D. Andersen, and Victor E. Lurvey, all of Sand Springs, Okla., assignors to Fibercast Company, Sands Spring, Okla.

Filed Sep. 26, 1984, Ser. No. 654,796

Int. Cl.[4] B29C *5/04*

U.S. Cl. 264—255 **4 Claims**



1. The method for forming a centrifugally cast pipe with an integral socket comprising:

(a) inserting a bell end slip into an empty mold tube of a centrifugal casting machine;

(b) inserting a sock of fibrous reinforcing material into the mold tube of the centrifugal casting machine, the sock of fibrous material inserted with a mandrel;

(c) rotating the mold so as to distribute the fibrous reinforcing material onto the mold and away from the mandrel;

(d) stopping the rotating mold and removing the mandrel;

(e) expanding the fibrous reinforcing material to conform the fibrous reinforcing material to the inside diameter of the bell end slip;

(f) placing the socket form tooling into the mold tube;

(g) securing the bell end slip and socket form tooling in place with a locking ring;

(h) rotating said mold to further expand the glass fabric;

(i) injecting into the bore of the mold tube at least one thermosetting resin while continuing to rotate the mold to distribute the thermosetting resin(s) longitudinally thereof; and

(j) maintaining the temperature of said mold while rotating the mold to cure the thermosetting resin(s).

4,714,579
METHOD AND AN APPARATUS FOR THE PRODUCTION OF SHAPED ARTICLES

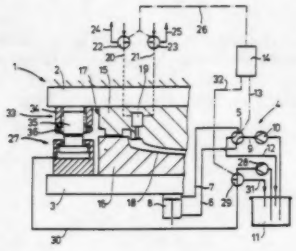
Heinrich Boden, Leverkusen, and Walter Schneider, Overath, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Jun. 4, 1986, Ser. No. 870,586

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1985, 3522377

Int. Cl.[4] B29C *45/67, 67/22*; C08G *18/08*

U.S. Cl. 264—328.6 **12 Claims**



1. A method for producing shaped articles in which:
(a) a mold tool is placed in a first position in which the shaping surfaces of the mold tool are brought together but are not completely closed to a distance of up to 5 mm from the closed position,
(b) introducing a reaction mixture into the molded tool,
(c) completely closing the mold tool when the mold is filled with reaction mixture,
(d) building up the pressure in the closed mold tool,
(e) curing the article thus-molded,
(f) opening the mold tool and,
(g) removing the molded article from the mold tool.

4,714,580
PLASTIC VESSEL HAVING ORIENTED COATING AND PROCESS FOR PREPARATION THEREOF

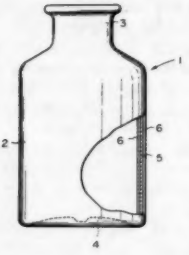
Yoshitsugu Maruhashi, Yokohama; Isao Tanikawa, Ayase, and Sadao Hirata, Kamakura, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Filed May 23, 1983, Ser. No. 496,996

Claims priority, application Japan, May 28, 1982, 57-89963

Int. Cl.[4] B29C *45/14*

U.S. Cl. 264—516 **4 Claims**



1. A process for the preparation of coated oriented plastic vessels, which comprises coating an aqueous latex of a vinylidene chloride copolymer on at least one surface of a bottomed parison composed of amorphous polyethylene terephthalate, drying the coated latex to form a coated structure provided with an outermost surface coating layer on a polyethylene terephthalate substrate and subjecting the coated structure to biaxial draw-blow-molding at a temperature higher than the glass transition temperature of the vinylidene chloride copolymer but lower than the melting point of the vinylidene chloride copolymer under such a condition that the temperature of the coating layer of the coated structure is lower by at least 5° C. than the average temperature of the polyethylene terephthalate substrate, at a draw ratio in the axial direction of 1.10 to 20 and at a draw ratio in the circumferential direction of 1.20 to 50, at which temperature draw-molding of said parison is possible, to thereby form the coated structure into a shape of a vessel while drawing the coating layer so that the coating layer of the vinylidene chloride copolymer has such a molecular orientation that the sum of two-dimensional orientation coefficients (1+m) in the axial direction and circumferential direction is at least 0.4 as measured according to the polarized light fluorometry and the coating layer is not substantially peeled at the low-temperature burst test conducted at −5° C.

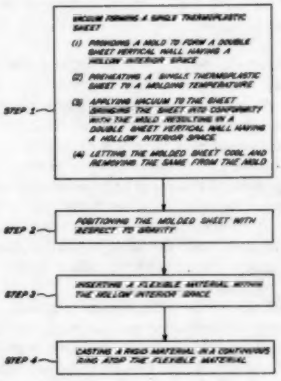
4,714,581
METHOD FORMING THREE DIMENSIONAL SIGN DISPLAY CHARACTER

Frank A. Witt, Lexington, S.C., assignor to Colite Industries, Inc., West Columbia, S.C.

Continuation of Ser. No. 141,144, Aug. 17, 1980, abandoned, which is a division of Ser. No. 956,101, Oct. 30, 1978, Pat. No. 4,202,123, which is a continuation of Ser. No. 700,218, Jun. 28, 1976, Pat. No. 4,122,616. This application Jul. 10, 1986, Ser. No. 883,857

Int. Cl.[4] B29C *51/10, 39/10, 67/18, 67/22*

U.S. Cl. 264—553 **2 Claims**


VACUUM FORMING A SINGLE THERMOPLASTIC SHEET
(1) PROVIDING A MOLD TO FORM A DOUBLE SHEET VERTICAL WALL HAVING A HOLLOW INTERIOR SPACE
(2) PREHEATING A SINGLE THERMOPLASTIC SHEET TO A MOLDING TEMPERATURE
(3) APPLYING VACUUM TO THE SHEET BRINGING THE SHEET INTO CONFORMITY WITH THE MOLD RESULTING IN A DOUBLE SHEET VERTICAL WALL HAVING A HOLLOW INTERIOR SPACE
(4) LETTING THE MOLDED SHEET COOL AND REMOVING THE SAME FROM THE MOLD
STEP 1
POSITIONING THE MOLDED SHEET WITH RESPECT TO GRAVITY
STEP 2
INSERTING A FLEXIBLE MATERIAL WITHIN THE HOLLOW INTERIOR SPACE
STEP 3
CASTING A RIGID MATERIAL IN A CONTINUOUS BEAD ATOP THE FLEXIBLE MATERIAL
STEP 4

1. A method of forming a sign display element from a sole unitary thin thermoplastic sheet comprising the steps of:
A. configuring the thermoplastic sheet including:
1. providing a mold with configured mold surfaces which is adapted for thermoforming the thermoplastic sheet into the configuration of said sign display element having a base of a particular shape and a double sheet vertical wall circumscribing the outer perimeter of said base with the two sheets of the wall being spaced apart to form a hollow interior space within the wall;
2. preheating a thin thermoplastic sheet;
3. thermoforming the thermoplastic sheet over the mold with the application of a vacuum to the thermoplastic sheet to aid in causing the sheet to be conformed to the mold; and
4. cooling and removing the molded sheet from the mold; and
B. rigidfying the molded sheet including:
1. positioning the vacuum formed sheet having the hollow interior space opening upwardly to form a mold form for performing the following steps;

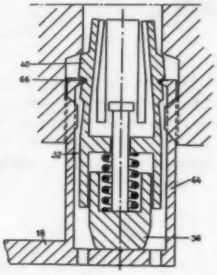
2. introducing supporting material into the bottom of the said hollow interior space of the vacuum molded sheet in contact with the two sheets of the wall;
3. pouring a curable resin material inside said hollow interior space on the top surface of said supporting material to a predetermined depth; and
4. curing said resin to a rigid material connecting the two sheets of the wall to form the sign display element.

4,714,582

ACTUATING DEVICE FOR LINEARLY MOVING A CLUSTER OF CONTROL ELEMENTS IN A NUCLEAR REACTOR

Jean-Pierre Denizou, Craponne, France, assignor to Fragema, Courbevoie, France

Filed Jan. 7, 1986, Ser. No. 816,781
Int. Cl.[4] G21C *7/06*
U.S. Cl. 376—233 **13 Claims**



1. For use in a nuclear reactor having an upper stationary structure, a lower stationary structure and a core under said lower stationary structure,

an actuating device for vertically moving a cluster of control elements between an upper position in engagement with said upper stationary structure and a lower position where said cluster is retained by said lower stationary structure, said actuating device comprising:

a vertical shaft movable along its axis and comprising gripping means at the lower end thereof,

grab means fast with said cluster and located at a top end thereof, said grab means having resilient fingers arranged to engage said gripping means and to be latched by snap fitting on the upper stationary structure in a predetermined position,

said gripping means being so shaped as to engage with said resilient fingers when the latter are unlatched from said upper structure and when said gripping means are raised beyond the predetermined position which causes locking of the grab on the upper stationary structure, whereas said lower fixed structure is arranged for causing forced disengagement of said gripping means when the latter are lowered by said shaft beyond a rest position of the grab means on said lower stationary structure, raising of the gripping means then driving the grab means by a simple abutment force.

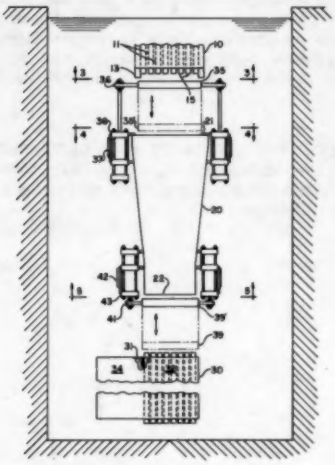
4,714,583

METHOD AND APPARATUS FOR COMPACTING SPENT NUCLEAR REACTOR FUEL RODS

William J. Wachter, Wexford, Pa., assignor to U.S. Tool & Die, Inc., Allison Park, Pa.

Continuation-in-part of Ser. No. 291,230, Aug. 10, 1981. This application Dec. 30, 1985, Ser. No. 814,481
Int. Cl.[4] G21C *19/32*
U.S. Cl. 376—261 **18 Claims**

1. A nuclear fuel handling system including a storage container, a fuel assembly having an array of nuclear fuel rods, and a gripper apparatus to move the array of fuel rods between the fuel assembly and the storage container, said gripper apparatus including the combination of gripper means supported by a frame to releasably engage at least diametrically opposite sides of fuel rods of said array,



means for pressing said gripper means into engagement with said fuel rods, and

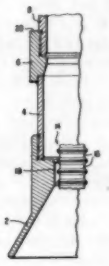
reciprocative means to move said gripper means between spaced-apart gripping and release positions for advancing said spent fuel rods an increment of length thereof in one axial direction relative to said storage container.

4,714,584

FLOW LIMITING HEAD ADAPTER EXTENSION

Denis J. Altman, Jeannette, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 12, 1985, Ser. No. 701,053
Int. Cl.[4] G21C *1/01, 7/00*
U.S. Cl. 376—353 **17 Claims**



7. In a nuclear reactor which includes a pressure vessel having a vessel head, a core in the vessel, elements for controlling the reactivity of the core, drive rods which pass through the vessel head for displacing the elements, and a plurality of head adapters which pass through the vessel head, each head adapter having an inner diameter and forming part of a drive rod housing enclosing a respective drive rod, each housing enclosing a region which communicates with the interior of the vessel and which is closed at the top, the improvement comprising a device associated with a respective housing and constituting a housing extension located within said vessel, said device including means for connecting said device to the head

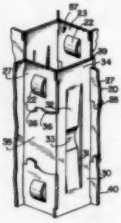
adapter forming part of said respective housing, said means for connecting having a substantially constant inner diameter substantially equal to that of said adapter, and means located at the lower end of said extension and supported by said connecting means for forming, with the associated drive rod and within said associated housing, an annular fluid passage, said means for forming having an inner diameter less than that of said means for connecting so as to give said annular fluid passage a cross-sectional area not exceeding a selected value at lealst upon the occurrence of a leak in said associated housing.

4,714,585

INTERLOCKING EGG-CRATE TYPE GRID ASSEMBLY

Steven J. Kast, Niskayuna, N.Y., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 15, 1985, Ser. No. 712,056
Int. Cl.[4] G21C *3/34*
U.S. Cl. 376—442 **12 Claims**



1. A spacer grid assembly for supporting a plurality of nuclear fuel pins in a closely-spaced array, comprising:

(a) a first grid strip comprising a plurality of segments, disposed at an angle to each other with alternate segments being substantially parallel to each other, each of said segments carrying at least one dimple for contacting said fuel pins;

(b) a second grid strip comprising a plurality of segments disposed at an angle to each other with alternate segments being substantially parallel to each other, each alternate segment of said second strip carrying a resilient contact for contacting said fuel pins;

(c) a third grid strip comprising a plurality of segments disposed at an angle to each other with alternate segments being substantially parallel to each other, each of said segments of said third strip carrying at least one dimple for contacting said fuel pins; and

(d) interlocking means formed on said grid strips for interlocking said first and third grid strips with said second grid strip to form an array of grid cells having a hexagonal cross section and said segments of said first and third grid strips are substantially coplanar, and wherein said interlocking means includes first tabs positioned on alternate segments of said first and third grid strips for interlocking with first slots formed on other alternate segments of said second grid strips that do not carry said resilient contacts.

4,714,586

METHOD OF PREPARING A DIMENSIONALLY STABLE ELECTRODE FOR USE IN A MCFC

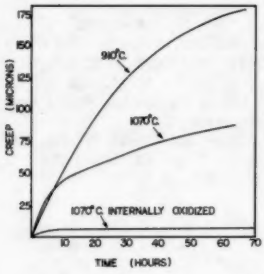
Thomas E. Swarr, South Windsor, and Wayne G. Wnuck, Stafford Springs, both of Conn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 29, 1986, Ser. No. 823,718
Int. Cl.[4] B22F *3/10*; C22C *32/00*
U.S. Cl. 419—2 **9 Claims**

1. A method of forming a dimensionally stable electrode structure for use in a fuel cell stack containing molten alkali metal carbonate electrolyte, said method comprising:

providing a porous plaque of nickel-chromium alloy having no more than 5 weight percent chromium;

Selectively oxidizing the chromiumin said plaque by exposure for at least one hour to a sufficient oxidizing potential



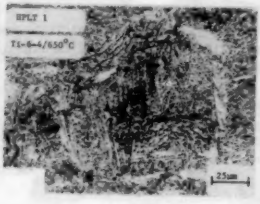
to oxidize chromium in the presence of nickel, said exposure provided by contacting said plaque with a gas mixture containing steam and hydrogen in a volumetric ratio of about 80–120 volumes of steam to one volume of hydrogen at a temperature of 600° C. to 800° C. to form said stable electrode structure.

4,714,587

METHOD FOR PRODUCING VERY FINE MICROSTRUCTURES IN TITANIUM ALLOY POWDER COMPACTS

Daniel Eylon, Dayton, and Francis H. Froes, Xenia, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 11, 1987, Ser. No. 13,818
Int. Cl.[4] C21D *1/00*
U.S. Cl. 419—29 **18 Claims**



1. A process for producing titanium alloy articles having a desired microstructure which comprises the steps of:

(a) providing a prealloyed titanium powder;

(b) filling a suitable mold with said powder; and

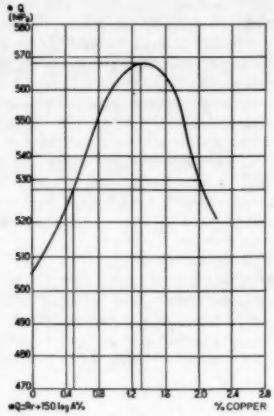
(c) consolidating the powder in the filled mold at a pressure of at least 30 ksi and a temperature about 60 to 80 percent of the beta transus temperature of said alloy, in degrees-C., for about 4 to 48 hours.

4,714,588

ALUMINUM ALLOY HAVING IMPROVED PROPERTIES

Roger Huet, Grenoble, France, assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 20, 1984, Ser. No. 683,851
Int. Cl.[4] C22C 21/02
U.S. Cl. 420—534 4 Claims



1. An aluminum alloy consisting essentially of about the following percentages of materials:

Si	6.5 to 7.5%
Mg	0.50 to 0.70%
Cu	1.2 to 1.4%

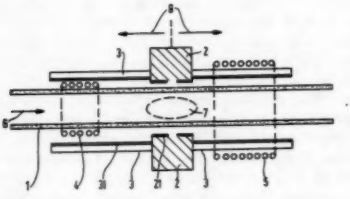
the remainder being constituted by aluminum, grain refiner and impurities the content of which is lower than 1.0%.

4,714,589

METHOD OF AND DEVICE FOR COATING THE INSIDE OF TUBES

Cornelis P. Auwerda, Eindhoven, Netherlands; Peter E. E. Geittner, Aachen, and Hans-Jürgen Lydtin, Stolberg, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 30, 1986, Ser. No. 880,263
Claims priority, application Fed. Rep. of Germany, Aug. 7, 1985, 3528275
Int. Cl.[4] B05D 3/06
U.S. Cl. 427—39 25 Claims



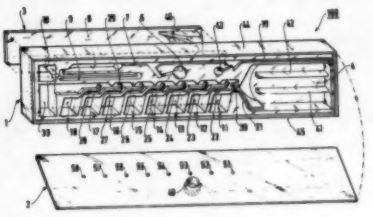
1. A method of coating the inside of a tube of an electrically insulating material with a second electrically insulating material by reactive deposition of the second electrically insulating material from a gas mixture which is passed through the tube, the tube being heated thermally and the deposition being activated by a plasma which is produced by microwaves and is reciprocated in the tube, characterized in that the tube is heated at least partly by the energy supplied by the plasma to the tube wall and is kept at the reaction temperature in that the thermal losses of the tube to the ambient are reflected back to the tube wall by a heat-reflecting element.

4,714,590

CONDITIONING STRIP FOR PERFORMING MEDICAL ANALYSES ON A SAMPLE OF LIQUID AND USING DRY REAGENTS

Jean Guigan, 9, rue Jean Mermoz, 75008 Paris, France

Filed Mar. 17, 1986, Ser. No. 840,614
Claims priority, application France, Mar. 26, 1985, 85 04477
Int. Cl.[4] G01N 21/07, 35/04
U.S. Cl. 422—102 3 Claims



1. A conditioning strip for performing medical analyses on a sample of liquid and using dry reagents, said strip being constituted by a container and a lid made of transparent plastic material, means defining an opening in said lid, a stopper for closing said opening, the container having longitudinal side walls and being compartmented in order to form,

a receptacle for said liquid sample, said receptacle being in communication with said opening through said lid, a calibrated cell,

a capillary duct connecting said receptacle to said calibrated cell, an overflow chamber, means connecting said calibrated cell to said overflow chamber;

a diluent tank for containing a diluent liquid situated beneath said calibrated cell and communicating via an inlet orifice within said container, said

inlet orifice being closed by said lid; a mixing vat situated at one end of said strip and communicating via respective capillary ducts with said calibrated cell and with said diluent tank, all of said above-mentioned capillary ducts being parallel to the longitudinal side walls of said container;

a series of reaction vats along one of said container longitudinal side walls, for containing respective solid reagents, and said reaction vats being connected via respective capillary ducts to a common duct in communication via capillary duct, with said mixing vat and acting as an overflow duct and terminating in a common overflow vat.

4,714,591

APPARATUS AND METHOD INVOLVING SUPERCRITICAL FLUID EXTRACTION

Michael M. Avedesian, Beaconsfield, Canada, assignor to Domtar Inc., Montreal, Canada

Continuation of Ser. No. 653,146, Sep. 22, 1983, abandoned, which is a division of Ser. No. 563,500, Dec. 22, 1983, Pat. No. 4,493,797. This application Jun. 9, 1986, Ser. No. 871,752
Int. Cl.[4] C07G 1/00
U.S. Cl. 422—140 2 Claims

1. An autoclave extractor to enable continuous extraction of a compound from a solution, with supercritical fluid under supercritical conditions, which extractor comprises:

(a) means for defining a pressurable chamber,

said chamber having a first end, and opposite said first end a second end, and

between said first end and said second end an intermediate chamber portion,

(b) said first end having a first outlet means provided with a first pressure let-down valve control,

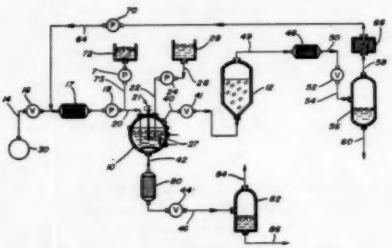
(c) said second end having a second outlet means provided with a second pressure let-down valve control,

(d) means for defining a zone separator between said second outlet means and said intermediate chamber portion,

(e) a first means for feeding into said intermediate chamber portion, a compound in solution, and

(f) a second means for feeding into said intermediate chamber portion, a supercritical fluid under supercritical condition,

whereby in said intermediate chamber portion provided with said means for feeding a compound in solution, and said means for feeding a supercritical fluid under supercritical condition, said compound is preferentially transferred from said solution into said supercritical fluid, and



said first let-down valve means causing a gradual pressure difference between said intermediate chamber and said first outlet, and thereby a flow of said supercritical fluid containig the compound from said intermediate chamber to said first outlet wherein said flow has a gradual decreasing pressure caused by both said first pressure let-down valve and the pressure from said supercritical fluid entering through said second feed means, whereby for each pressure differential, there is a much greater corresponding density differential between said supercritical fluid containing the compound, and the depleted solvent,

said density differential causing separation of the supercritical fluid containing compound from the depleted solvent and the escape of said supercritical fluid containing compound through said first outlet,

and said zone separator preventing a substantial pressure drop in said intermediate chamber portion while enabling simultaneously the passage therethrough of the solvent depleted from said compound in said intermediate chamber portion to said second outlet.

4,714,592

RADIAL FLOW CATALYTIC REACTOR INCLUDING HEAT EXCHANGE APPARATUS WITHIN THE BED

Jun Zanma, Yachiyo; Yoshinori Nishimura, Chiba; Kazuo Shyoji, Funabashi; Makoto Shimagaki, Sakura, and Yoichi Nakajima, Chiba, all of Japan, assignors to Toyo Engineering Corporation, Tokyo, Japan

Filed Jan. 9, 1985, Ser. No. 690,028

Claims priority, application Japan, Jan. 18, 1984, 59-6826

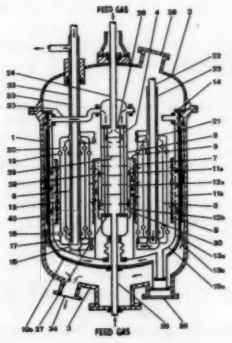
Int. Cl.[4] B01J *8/04*

U.S. Cl. 422—192 **16 Claims**

1. In a reactor including an outer pressure vessel having an inlet passage for feeding gaseous feed materials into said pressure vessel and an outlet passage for discharging a product gas therefrom, a bed of a granular catalyst and means for flowing a reactant gas comprising the gaseous feed materials through said granular catalyst so that it reacts to form a product gas, means for cooling the product gas and preheating the gaseous feed materials, and means for cooling the reactant gas as the reactant gas passes through said catalyst bed, the improvement which comprises:

said outer pressure vessel is upright and cylindrical, and comprises a bottom cover and a removable top cover;

said cooling and preheating means comprises a heat exchanger centrally mounted within said outer pressure vessel coaxially therewith, said heat exchanger comprising a substantially cylindrical outer shell, upper and lower partition plates subdividing the interior of said shell in the lengthwise direction thereof, a plurality of heat exchanger tubes extending from said upper partition plate to said lower partition plate, said heat exchanger tubes opening above said upper partition plate and opening below said lower partition plate, said partition plates being positioned so as to define a shell-side heat exchange compartment therebetween, an upper chamber above said upper partition plate and a lower chamber below said lower partition plate, said shell of said heat exchanger having openings at opposite end portions thereof so that a gas can enter said compartment near one end of said compartment and be discharged from the opening at the other end of said compartment, said inlet passage for the gaseous feed materials being in communication with said shell-side heat exchage compartment of said heat exchanger so that the gaseous feed materials undergo heat exchange and are thereby preheated before being fed to said catalyst bed;



said catalyst bed comprises spaced-apart inner and outer cylindrical gas-permeable catalyst retainers being positioned and arranged so as to define an intercylinder space therebetween coaxial with said outer pressure vessel and said heat exchanger, said inner catalyst retainer being of smaller diameter than said outer catalyst retainer, and a bottom wall extending beneath said catalyst retainers and fixedly connecting said catalyst retainers to each other, said catalyst retainers and said bottom wall being spaced apart from the inner periphery of said outer pressure vessel, said granular catalyst being packed in the intercylinder space between said inner and outer catalyst retainers above said bottom wall;

said cooling means comprises a cooling structure having a coolant inlet passage and a coolant outlet passage which both extend through said top cover of said outer pressure vessel, and a multiplicity of vertical cooling tubes which extend through said catalyst bed, said granular catalyst being packed around said cooling tubes, each of said cooling tubes being in communication with said coolant inlet passage and said coolant outlet passage so that a liquid coolant may be circulated through said cooling structure to absorb reaction heat generated in said catalyst bed;

a cylindrical, gas-impermeable, outer, partition wall coaxial with said outer pressure vessel and located between said

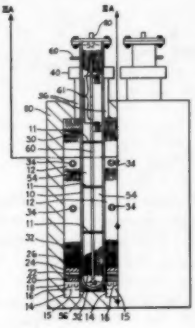
outer pressure vessel and said outer gas-permeable catalyst retainer and spaced therefrom and positioned so as to define a first outer gas flow passageway between said outer pressure vessel and said cylindrical outer partition wall and a second inner gas flow passageway between said cylindrical outer partition wall and said outer catalyst retainer, whereby the product gas from said catalyst bed is discharged through said outer catalyst retainer into said second inner gas flow passageway, flows through said second inner flow passageway and thence into the tubes of said heat exchanger, undergoes heat exchange with the gaseous feed materials, in said heat exchanger, thereby cooling the product gas, and then is fed through said first outer gas flow passageway to said product gas outlet formed on said outer pressure vessel.

4,714,593

REFORMING APPARATUS

Akio Naito; Hirohisa Uozu, and Toru Numaguchi, all of Chiba, Japan, assignors to Toyo Engineering Corporation, Tokyo, Japan

Filed Mar. 6, 1987, Ser. No. 22,840
Claims priority, application Japan, Mar. 10, 1986, 61-53346
Int. Cl.[4] B01J *7/00, 8/06*
U.S. Cl. 422—197 **12 Claims**



1. A reaction apparatus comprising: at least one reaction vessel for effecting an endothermic reaction and heat generation means on the outside of and in contact with said reaction vessel;

said heat generation means comprising a mixing chamber at one end of said heat generation means, means for supplying primary fuel gas to said mixing chamber and means for supplying an oxygen-containing gas to said mixing chamber so that said fuel gas and said oxygen-containing gas are mixed together in said mixing chamber;

a preheating chamber for receiving said mixture of said fuel gas and said oxygen-containing gas and preheating said mixture;

a gas-permeable catalyst bed containing a catalyst for causing combustion of said preheated mixture, said catalyst bed being disposed adjacent to said preheating chamber for receiving said preheated mixture therefrom;

a combustion chamber for receiving the burning mixture from said catalyst bed, said combustion chamber containing secondary fuel gas supply means for supplying additional fuel gas to said combustion chamber, said combustion chamber containing heat-transfer bodies at least partially filling said combustion chamber;

and first discharge means for discharging gaseous products of combustion from said combustion chamber, wherein said mixing chamber, said preheating chamber, said gas-permeable catalyst bed, said combustion chamber and said first discharge means are arranged in series in that order from said one end of said heat generation means to the opposite end thereof;

said reaction vessel being contacted by said combustion chamber, whereby heat is transferred from said combustion chamber to said reaction vessel;

means for supplying a reactant gas to said reaction vessel at a location beyond said opposite end of said heat generation means, thence flowing said reactant gas through said reaction vessel in a direction opposite to the direction in which fuel gas and gaseous products of combustion of said fuel gas flow through said heat generation means whereby to cause the reactant gas to react to form a reaction product gas, at least one discharge passage means extending into said reaction vessel for isolating said reaction product gas from said reactant gas and flowing it through said reaction vessel in the same direction as the direction in which fuel gas gaseous products of combustion thereof flow through said heat generation means;

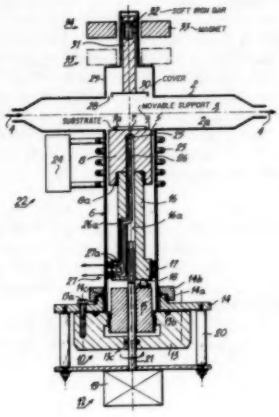
and second discharge means for discharging said reaction product gas from said discharge passage means.

4,714,594

REACTOR FOR VAPOR PHASE EPITAXY

Andréi S. Mircea, 31 rue Frederic Mistral, 91330 Yerres, France

Filed Jun. 25, 1985, Ser. No. 748,443
Claims priority, application France, Jun. 27, 1984, 84 10154
Int. Cl.[4] C30B *35/00, 25/10;* **C23C** *16/00;* **B05D** *5/12*
U.S. Cl. 422—245 **5 Claims**



1. A reactor for vapour phase epitaxy on one face of at least one substrate, comprising:

at least one substrate;

at least one support on one face of which is placed the substrate;

means for heating the substrate;

tubular chamber means for circulation of an epitaxy gas stream therein, wherein the chamber means has a planar wall with at least one opening formed therein for receiving the face of the support provided with the substrate, and wherein said chamber means includes a longitudinal axis and a gas inlet and outlet means located at opposite ends of said chamber for flow of gas in a single direction along the longitudinal axis of said chamber and parallel to said face of said support;

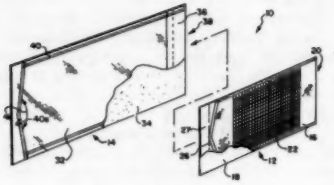
positioning means for positioning the face of the support substantially in said at least one opening of said planar wall and parallel to said direction of said gas flow and

means for rotating the face of the support about an axis perpendicular to the support face and perpendicular to said direction of said gas stream.

4,714,595
TISSUE STORAGE SYSTEM

Jack Anthony, Lake Bluff; Arnold C. Bilstad, Deerfield; Wayne T. Leblong, Crystal Lake, and Robert J. Kruger, Arlington Heights, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Dec. 27, 1984, Ser. No. 686,948
Int. Cl.[4] B65D *81/00*
U.S. Cl. 422—294 24 Claims



1. A storage system comprising:

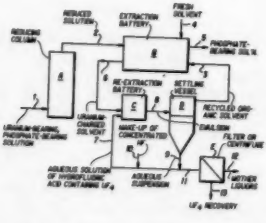
(a) a first thin film container for containing material to be sterilized, having means defining a sealable opening, means defining a transparent portion for viewing the material contained therein and a gas permeable portion to allow gas sterilization of the interior of said first container; and

(b) a second thin film container, dimensioned to contain said first container, having a selectively sealable opening which includes a gas permeable portion and which is selectively sealable in a first sealed position that allows gas sterilization of the first container through said gas permeable portion of said second container, said second container being selectively sealable in a second sealed position in which said second container provides a gas barrier, and a gas impermeable transparent portion for viewing the material in said second container providing a gas barrier when sealed.

4,714,596
PROCESS FOR THE RECOVERY IN THE FORM OF TETRAVALENT FLUORIDE OF URANIUM EXTRACTED FROM PHOSPHATE-BEARING SOLUTIONS

Antoine Floreancig, Saint Genis Laval, France, assignor to Uranium Pechiney, Courbevoie, France

Filed Nov. 6, 1985, Ser. No. 795,410
Claims priority, application France, Nov. 16, 1984, 84 17993
Int. Cl.[4] C01G *43/06*
U.S. Cl. 423—10 15 Claims



1. A process for the recovery of uranium from a phosphate-bearing solution, comprising:

(a) reducing the uranium in the phosphate-bearing solution to the tetravalent state;

(b) extracting the said uranium from the said phosphate-bearing solution with an organic solvent comprising a hydrocarbon and either (b1) a mono- and a dialkylphenylphosphoric acid or (b2) an alkylpyrophosphoric acid;

(c) re-extracting the uranium from the organic solvent by contacting the said organic solvent with an aqueous solution of hydrofluoric acid containing UF_4 as a suspension and present in an amount sufficient to enhance uranium extraction from the said organic solvent, to obtain an emulsion;

(d) separating the organic solvent from which uranium has been removed from the emulsion formed in step (c) to obtain an aqueous suspension;

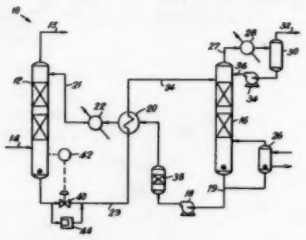
(e) recycling the said organic solvent obtained from step (d) to extraction step (b) with a make-up amount of pure organic solvent; and

(f) recovering UF_4 from the aqueous suspension obtained in step (d).

4,714,597
CORROSION INHIBITOR FOR CO_2 ABSORPTION PROCESS USING ALKANOLAMINES

Juan A. V. Trevino, San Nicolas de los Garza, Mexico, assignor to Hylsa, S.A., Monterrey, Mexico

Filed Jun. 26, 1986, Ser. No. 879,059
Int. Cl.[4] C01B *17/16, 31/20*
U.S. Cl. 423—228 8 Claims



1. In a process for the recovery of carbon dioxide from a feed gas containing the same and at least half of said gas being composed of either hydrogen or carbon monoxide or both which may also contain sulfur compounds, by contacting the gas in ferrous metal processing equipment with a circulating alkanolamine solution containing copper and treating said solution rich in CO_2 with heat to release the CO_2 thereby producting a lean solution and cooling and returning the so-treated lean solution to the contacting step, the improvement which comprises maintaining a corrosion inhibiting means consisting essentially of copper ions and zinc ions in said circulating solution in an amount effective to inhibit corrosion of the ferrous metal processing equipment and/or degradation of the solvent by bringing said circulating solution into contact with a metal selected from bronze and brass.

4,714,598
METHODS OF DESULFURIZING GASES

D. Alan R. Kay, Burlington, Ontario, Canada, and William G. Wilson, Allegheny County, Pittsburgh, Pa. 15229

Division of Ser. No. 718,989, Apr. 2, 1985, Pat. No. 4,604,268, which is a continuation-in-part of Ser. No. 521,751, Aug. 8, 1983, Pat. No. 4,507,149, which is a continuation-in-part of Ser. No. 471,773, Mar. 3, 1983, which is a continuation of Ser. No. 174,024, Jul. 31, 1980, Pat. No. 4,397,683. This application Mar. 31, 1986, Ser. No. 846,272
The portion of the term of this patent subsequent to Aug. 5, 2003, has been disclaimed.
Int. Cl.[4] B01D *53/36;* C01B *17/00;* B01J *8/00*
U.S. Cl. 423—230 2 Claims

1. A method for desulfurizing gases formed by the incomplete combustion of sulfur containing hydrocarbons at high temperature in which gases the sulfur is mainly in the form of one of hydrogen sulfide and sulfur carbonyl whereby the sulfur is removed to sufficiently low levels that when combustion of the gases is completed the gases emitted the atmosphere have a sulfur content which is less than one pound of sulfur per

million British thermal units produced by combustion of fuel or its equivalent comprising the steps of:

a. Controlling the incomplete combustion of the sulfur containing hydrocarbons so that the ratio of carbon monoxide to carbon dioxide (CO/CO_2) ratio at standard conditions (32° F. and one atmosphere pressure) is greater than one; and

b. Reacting the gases whose CO/CO_2 ratio is greater than one and whose sulfur content is in the form of either H_2S and sulfur carbonyl (COS) with cerium oxide, whereby the H_2S content of the desulfurized gases is less than 1000 part per million when the ratio of the CO/CO_2 is greater than one and the temperature is less than 1600° C.

4,714,599

PROCESS FOR PREPARING RHOMBOHEDRAL SYSTEM BORON NITRIDE USING $NABH_4$-AND NH_4CL

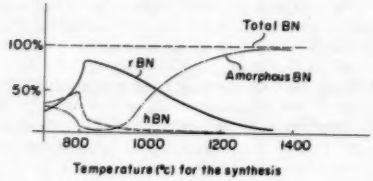
Tadao Sato, and Toshihiko Ishii, both of Sakura, Japan, assignors to National Institute for Researches in Inorganic Materials, Ibaraki, Japan

Continuation-in-part of Ser. No. 440,998, Nov. 12, 1982, abandoned. This application Aug. 22, 1984, Ser. No. 643,318

Claims priority, application Japan, Apr. 15, 1982, 57-63067

Int. Cl.⁴ C01B *21/064*

U.S. Cl. 423—290 **8 Claims**



1. A process for preparing rhombohedral system boron nitride, which comprises mixing $NaBH_4$ with at least an equimolar amount of NH_4Cl, and heating the resulting mixture in a non-oxidizing atmosphere at a temperature of at least 750° C. and lower than 1000° C. for at least 3 hours.

4,714,600

PROCESS FOR PRODUCTION OF PHOSPHORIC ACID FROM DRY MATRIX BY SO_3 TREATMENT AND EXTRACTION

Patrick R. Driscoll, Spotswood, and Ross A. Kremer, Ringoes, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 24, 1984, Ser. No. 685,509

Int. Cl.⁴ C01B *25/16*

U.S. Cl. 423—319 **6 Claims**

1. A process for producing phosphoric acid from phosphate ore matrix comprising:

(A) drying the phosphate ore matrix;

(B) acidulating the dry matrix with sulfur trioxide in the presence of sulfuric acid catalyst;

(C) removing said sulfur trioxide from the matrix;

(D) treating the acidulated matrix with sufficient water to convert phosphorus values to orthophosphoric acid; and

(E) extracting the orthophosphoric acid with methanol or ethanol.

4,714,601

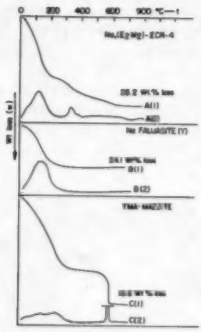
PROCESS FOR PREPARING A HIGH SILICA FAUJASITE ALUMINOSILICATE, ECR-4

David E. W. Vaughan, Flemington, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Filed May 4, 1984, Ser. No. 606,940

Int. Cl.⁴ C01B *33/28*

U.S. Cl. 423—329 **3 Claims**



1. A process for preparing an aluminosilicate having a faujasite structure, a silica to alumina mole ratio of at least five, and ions within the super cages of said aluminosilicate selected from the group consisting of bis-(2-hydroxyethyl)dimethylammonium ions and bis-(2-hydroxypropyl)dimethylammonium ions which comprises the steps of:

(a) preparing a reaction mixture comprising sodium aluminate, alum, water, sodium silicate, aluminum sulfate, an organic template and nucleating seeds of about the composition 13.33 Na_2O:Al_2O_3:12.5SiO_2:267H_2O, said reaction mixture having a composition, in terms of mole ratios of oxides, within the following ranges:

$(Na,T)_2O$:Al_2O_3: 1.6 to 8

SiO_2:Al_2O_3: 4 to 20

H_2O:Al_2O_3: 100 to 400

wherein T represents a bis-(2-hydroxyethyl)dimethylammonium or bis-(2-hydroxypropyl)dimethylammonium group, and said seeds being present in an amount to yield 0.1 to 10 mole percent of the total final alumina content in said aluminosilicate;

(b) blending the reaction mixture sufficiently to form a substantially homogeneous mixture;

(c) maintaining the reaction mixture between 90° and 120° C. under autogenous pressure for a sufficient period of time to form crystals of said aluminosilicate; and

(d) recovering said aluminosilicate crystals.

4,714,602

PROCESS FOR THE PREPARATION OF SOLID SODIUM HYDROGEN CYANAMIDE

Helmut Krommer, Fasanenstrasse, D-8223 Trostberg; Karl-Heinz Neuhauser, Am-Ederberg 3, D-8261 Taufkirchen-Gallenbach, and Stefan Weiss, Sonnenleite 8, D-8223 Trostberg, all of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 745,789, Jun. 17, 1985, abandoned. This application Jul. 16, 1986, Ser. No. 886,014

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1984, 3422595

Int. Cl.⁴ C01C *3/16*

U.S. Cl. 423—369 **7 Claims**

1. A process for the preparation of solid sodium hydrogen cyanamide, which comprises:

(a) reacting cyanamide with sodium hydroxide in aqueous solution; and

(b) concentrating the aqueous solution containing sodium hydrogen cyanamide with a drier device which uses a

heating gas, said drier device being either a spray drier or an atomization drier, wherein the heating gas enters said drier device at a temperature of 110° C. to 200° C. and exits at a cooler temperature of 40° C. to 120° C. to produce a fine-particled powder having a moisture content of approximately 1 to 3% by weight.

4,714,603

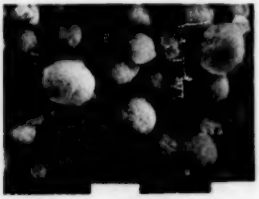
SPHERICALLY SHAPED PRECIPITATED CALCIUM CARBONATE, ITS PREPARATION AND USE

Dennis B. Vanderheiden, Easton, Pa., assignor to Pfizer, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 662,103, Oct. 18, 1984, abandoned. This application May 8, 1986, Ser. No. 860,946

Int. Cl.[4] C01F *5/24, 11/18*

U.S. Cl. 423—432 **9 Claims**



1. A precipitated calcite having particles of substantially spherical morphology with an average spherical diameter of from about 2 to 10 microns, a particle size distribution such that at least about 50 weight percent of the particles lie within 50 percent of the average spherical diameter, a specific surface area of from about 1 to 15 square meters per gram, a void volume of from about 0.5 to 1.0 cubic centimeter per gram, and a plurality of up to about 5000 surface nodules per particle, the nodules having a height of from about 0.02 to 1.0 micron and an aspect ratio of less than about 2.

4,714,604

METHOD OF SEPARATING HF AND SiF_4 FROM HCL

Robert S. Olson, Lafayette, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 13, 1986, Ser. No. 896,165

Int. Cl.[4] C01B *7/07*

U.S. Cl. 423—488 **20 Claims**

10. A method of separating HF from a mixture of HF and HCl comprising:

contacting said mixture with SiO_2 to form a mixture of SiF_4 and HCl;

establishing an aqueous solution of SiF_4 and HCl having a concentration of HCl at a level effective to provide a relative volatility SiF_4/HCl at greater than 1;

distilling said solution of SiF_4 and HCl to remove said SiF_4 from said HCl and

collecting SiF_4 as an aqueous distillate; and

collecting aqueous HCl as a bottom product.

4,714,605

TECHNETIUM-99M LABELED DIOXIME COMPLEXES

Thomas A. Feld, Califon; Pedro N. Juri, Lawrenceville, both of N.J., and Elizabeth N. Treher, Washington Crossing, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Oct. 14, 1986, Ser. No. 918,434

Int. Cl.[4] A61K *43/00;* **C07F** *13/00*

U.S. Cl. 424—1.1 **12 Claims**

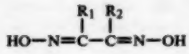
1. A technetium-99m dioxime complex having the formula

$^{99m}Tc\ X(Y)_3$

wherein

X is a halogen; and

Y is a vicinal dioxime having the formula



or a pharmaceutically acceptable salt thereof, wherein R_1 and R_2 are each independently hydrogen, halogen, alkyl, aryl, amino or a 5 or 6-membered nitrogen or oxygen containing heterocycle, or together R_1 and R_2 are $-(CR_3R_4)_n-$ wherein n is 3, 4, 5 or 6 and R_3 and R_4 are each independently hydrogen or alkyl.

4,714,606

METHOD OF STAINING AND IDENTIFYING CELLS AND COMPOSITIONS THEREOF

Lawrence Kass, Hinckley, Ohio, assignor to Cytocolor Incorporated, Hinckley, Ohio

Continuation-in-part of Ser. No. 610,381, May 15, 1984, abandoned, which is a continuation-in-part of Ser. No. 494,971, May 16, 1983, abandoned. This application Aug. 13, 1985, Ser. No. 765,348

Int. Cl.[4] G01N *1/00, 33/48*

U.S. Cl. 424—3 **29 Claims**

1. A method for differentiating, identifying and enumerating cells from each other among a plurality of cells of hematopoietic origin selected from the group consisting of blood cells, bone marrow cells and lymph node cells which comprises fixing said cells in an organic fixative and subsequently staining said fixed cells with a staining amount of a water soluble quaternary azo dye, identified as Basic Blue 41, (C.I. 11154) to obtain a plurality of stained cells; said stained cells having individual color characteristics which permit the differentiation, identification and enumeration of each cell.

4,714,607

NMR CONTRAST AGENTS

Jo Klaveness, Oslo, Norway, assignor to Nycomed AS, Oslo, Norway

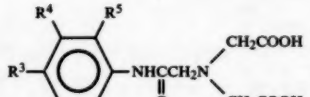
Filed May 30, 1985, Ser. No. 739,228

Claims priority, application United Kingdom, May 30, 1984, 8413772

Int. Cl.[4] A61K *49/00;* **G01N** *31/00, 33/48*

U.S. Cl. 424—9 **27 Claims**

1. An NMR contrast agent comprising at least one water-soluble non-radioactive paramagnetic metal chelate together with at least one physiologically acceptable carrier or excipient, wherein the chelating entity is a chelating agent of formula I



(I)

wherein R^1 to R^5, which may be the same or different, each represent hydrogen or halogen atoms, optionally halogenated alkyl or alkoxy groups or carboxyl groups, or a physiologically acceptable salt thereof.

4,714,608

AQUEOUS DENTAL PREPARATION CONTAINING FLUORIDE IONS AND THE USE THEREOF

Gunnar Rölla, Kragsvn. 13, 0391 Oslo 3, Norway

Filed Jun. 9, 1986, Ser. No. 879,229
Claims priority, application Norway, Oct. 9, 1984, 844037
Int. Cl.[4] A61K 7/18
U.S. Cl. 424—52 10 Claims

1. A dental preparation for topical application on teeth, containing fluoride ions in aqueous solution, having a maximum pH of about 2 and a minimum pH which is not so low as to be harmful.

4,714,609

SKIN TANNING COMPOSITION

Anthony A. Carden, Fort Worth, Tex., assignor to Laverne Stanley, Fort Worth, Tex.

Filed Jul. 21, 1986, Ser. No. 887,287
Int. Cl.[4] A61K 7/42, 7/44
U.S. Cl. 424—59 2 Claims

1. A method of tanning the human epidermis which comprises applying to said epidermis a composition comprising a cosmetic base, and an effective amount of vanillin, the vanillin being present in an amount effective to react with the skin epidermis to produce a carbonyl-amine reaction which results in accelerated tanning of the epidermis upon exposure to the sun's rays.

4,714,610

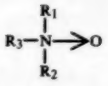
LOW pH HAIR CONDITIONER COMPOSITIONS CONTAINING AMINE OXIDES

Terry Gerstein, Brunswick, N.J., assignor to Revlon, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 632,745, Jul. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 406,668, Aug. 9, 1982, abandoned. This application Dec. 27, 1985, Ser. No. 814,105
Int. Cl.[4] A61K 7/075
U.S. Cl. 424—70 17 Claims

1. A cationic hair conditioning composition comprising:

(a) an amine oxide of the formula:



wherein R_1 and R_2 are the same or different moieties and are selected from lower (C_1–C_4) alkyl, alkoxy and hydroxy alkyl groups, and R_3 is an alkyl group containing 8 to 22 carbon atoms; and

(b) water and sufficient acid to provide a pH for said composition of from about 3.8 to about 2.4 and an amine oxide concentration from about 0.5% to about 10% based on the total weight of said hair conditioning composition.

4,714,611

STABLE COMPOSITION OF GAMMA-INTERFERON

Akagi Yasaburgo, Takatsuki; Miura Yasumoto, Kawanishi, and Hoshino Tetsuo, Toyonka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 22, 1985, Ser. No. 693,669
Claims priority, application Japan, Jan. 23, 1984, 59-10857; Jan. 9, 1985, 60-2585
Int. Cl.[4] A61K 45/02; C07K 15/26
U.S. Cl. 424—85 25 Claims

1. A human γ-interferon composition frozen or lyophilized in the presence of an aqueous solution comprising 3 to 50 mg/ml dextran or hydroxyethylstarch or a combination thereof.

4,714,612

COMPOSITION FOR ORAL APPLICATION

Tsuneaki Nakamura, Odawara; Tatsuo Kiyoshige, Hadano, and Shuji Sasaki, Hiratsuka, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed Jun. 24, 1985, Ser. No. 748,393
Claims priority, application Japan, Jun. 28, 1984, 59-132103
Int. Cl.[4] A61K 39/395
U.S. Cl. 424—85 8 Claims

1. A method for preventing Bacteroides gingivalis from colonizing in the mouth comprising intraorally administering an effective amount of a non-specific γ-globulin to prevent Bacteroides gingivalis from colonizing in the mouth.

4,714,613

METHOD OF SUPPRESSING CELL GROWTH BY IMMUNOTHERAPY

Daniel Shouval, Jerusalem, Israel; David A. Shafritz, Larchmont, N.Y., and Jack R. Wands, Waban, Mass., assignors to The Albert Einstein College of Medicine of Yeshiva University, New York, N.Y. and The General Hospital Corporation, Boston, Mass.

Filed Sep. 30, 1982, Ser. No. 428,653
Int. Cl.[4] A61K 39/42, 39/00; C12P 21/00; C12Q 1/02
U.S. Cl. 424—86 6 Claims

1. A method of selectively suppressing the growth of HBV infected hepatocytes or hepatoma cells which express or present, or which are capable of expressing or presenting HBsAg on the surface thereof, wherein said HBsAg is coded for by the DNA of the HBV, which comprises administering to said cells, while in the presence of other cells which do not express or present said HBsAg, a growth suppressing amount of a complement fixing monoclonal antibody against said HBsAg.

4,714,614

PROCESS FOR INDUCING SUPPRESSIVENESS TO FUSARIUM VASCULAR WILT DISEASES

Frances M. Scher, Fort Collins, Colo., assignor to Colorado State University, Fort Collins, Colo.

Continuation of Ser. No. 335,895, Dec. 30, 1981, abandoned. This application Oct. 29, 1984, Ser. No. 665,096
Int. Cl.[4] A01N 63/00
U.S. Cl. 424—93 25 Claims

1. A *Fusarium oxysporum* growth suppression composition which comprises a *Fusarium oxysporum* disease suppressive amount of at least one *Fusarium oxysporum* disease suppressant selected from the group consisting of a *Fusarium oxysporum* disease suppressive strain of *Pseudomonas putida* having the identifying characteristics of NRRL B-15001, and said *Fusarium oxysporum* disease suppressing strain of *Pseudomonas putida* in combination with a *Fusarium oxysporum* disease suppressing ferric iron chelating agent which forms a chelate whose stability is greater than the stability of the ferric iron chelate of ethylenediaminetetraacetic acid or the corresponding ferric iron chelate of said agent, and a biologically compatible carrier.

4,714,615

SKIN TREATMENT COMPOSITIONS COMPRISING UNOXIDIZED NERVE TISSUE

Rina Youssefyeh, 67 Amhurst Way, Princeton Jnc., N.J. 08550

Continuation-in-part of Ser. No. 599,010, Apr. 11, 1984, abandoned. This application Apr. 11, 1986, Ser. No. 850,569
Int. Cl.[4] A61K 35/12
U.S. Cl. 424—95 5 Claims

1. A method for cleansing human skin comprising topically applying to said human skin a composition comprising: from 1.5 to 2.5 parts by weight of a powdery, cosmetically acceptable inorganic substance selected from the group consisting of calcium acetate, calcium carbonate, calcium formate, calcium gluconate, calcium lactate, calcium oxalate, calcium phosphate, calcium stannate, magnesium carbonate, magnesium

aluminum silicate, zinc carbonate, zinc aluminum silicate, silica, talc and mixtures thereof and 1 part by weight of unoxidized cattle spinal cord.

4,714,616

PREPARING NATURALLY SWEET YOGURT WITH SACCHAROMYCOPSIS SP. AND RHIZOPUS SPP.

Anthony H. Kao, 91 Lawai Street, Honolulu, Hi. 96825

Continuation of Ser. No. 620,323, Jun. 12, 1984, abandoned. This application Sep. 29, 1986, Ser. No. 913,561

Int. Cl.[4] A23C *9/12;* **A23L** *1/20;* **C12G** *1/00*

U.S. Cl. 426—42 **9 Claims**

1. A process for preparing a yogurt product having a bland, unique, sweet taste, said process comprising the successive steps of:

(a) heating dairy or a vegetable-based milk to a temperature sufficient to sterilize the milk;

(b) homogenizing the sterilized milk to uniformly distribute the fat particles therein;

(c) innoculating the homogenized milk of step (b) wiht an innoculant consisting essentially of rice wine containing a milk coagulating amount of Saccharomycopsis sp. and Rhizopus spp. and allowing the culture to grow until the milk is coagulated;

(d) pasteurizing the milk coagulum of step (c); and

(e) cooling the pasteurized milk coagulum to yield a bland, sweet-tasting yogurt product.

4,714,617

PROCEDURE FOR SEGREGATION OF MIXTURE OF SUBSTANCES CONTAINING ORGANIC COMPONENTS

Hans J. Gährs, Dusseldorf, Fed. Rep. of Germany, assignor to Messer Griesheim GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 644,040, Aug. 24, 1984, abandoned. This application Mar. 27, 1986, Ser. No. 845,474

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1983, 3331906

Int. Cl.[4] A24B *15/24;* **A23F** *5/20*

U.S. Cl. 426—427 **12 Claims**

1. In a procedure for decaffeinating raw coffee by high pressure extraction wherein a gaseous solvent is charged into the coffee in an extractor under high pressure conditions to dissolve the caffeine of the coffee, the mixture of solvent and coffee components then being conveyed to a separator in a separation stage from which the coffee components are extracted and removed and with the solvent being conveyed from the separator for reuse in a further extraction procedure, the improvement being in the solvent being selected from the group consisting of CO_2, N_2 and mixtures thereof, admixing at least one additive selected from the group consisting of CO_2, N_2 and Ar to the charged solvent immediately before or directly into the separation stage, the additive reducing the solvent capacity of the solvent and functioning to facilitate the achievement of a precipitation in the separator for at least a portion for the components to be extracted, the additive containing at least one material different from the solvent to permit the later separation of the additive from the solvent, segregating the mixture of solvent/additive from which the precipitated components have been removed into solvent and additive components in a preparation stage, thereafter again adding the solvent to the mixture of substances for purposes of continued extraction, and again admixing the additive components to the charged solvent by conveying the additive components in a circuit which does not include the extractor.

7. In a procedure for the denicotinization of tobacco by high pressure extraction wherein a gaseous solvent is charged into the tobacco in an extractor under high pressure conditions to dissolve the nicotine of the tobacco, the mixture of solvent and tobacco components then being conveyed to a separator in a separation stage from which the tobacco components are extracted and removed and with the solvent being conveyed from the separator for reuse in a further extraction procedure, the improvement being in the solvent being selected from the group consisting of CO_2, N_2 and mixtures thereof, admixing at least one additive selected from the group consisting of CO_2, $N_2$and Ar to the charged solvent immediately before or directly into the separation stage, the additive reducing the solvent capacity of the solvent and functioning to facilitate the achievement of a precipitation in the separator for at least a portion of the components to be extracted, the additive containing at least one material different from the solvent to permit the later separation of the additive from the solvent, segregating the mixture of solvent/additive from which the precipitated components have been removed into solvent and additive components in a preparation stage, thereafter again adding the solvent to the mixture of substances for purposes of continued extraction, and again admixing the additive components to the charged solvent by conveying the additive components in a circuit which does not include the extractor.

4,714,618

PROCESS FOR TREATING FROZEN BLOCK MEAT

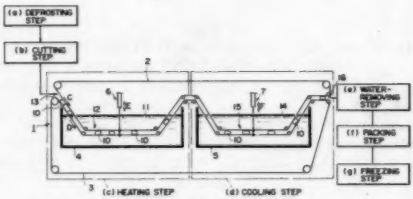
Eiichi Matsuda, Kagawa, Japan, assignor to Fine Foods Research Cooperative Union, Kagawa, Japan

Filed Apr. 13, 1987, Ser. No. 37,664

Claims priority, application Japan, May 17, 1986, 61-113191

Int. Cl.[4] A23B *4/06;* **A23L** *3/36*

U.S. Cl. 426—524 **6 Claims**



1. A process for treating frozen block meat, comprising the steps of:

subjecting the frozen block meat to an environment maintained at a temperature of between −4° C. and 0° C. for defrosting the frozen block meat;

cutting the defrosted block meat into pieces of a thickness of about 30 mm or less;

heating the cut meat with steam or hot water having a temperature of 80°–100° C. for a period of 30–90 seconds;

then cooling the heated cut meat in cold water having a temperature of 5° C. or below for a period of 1–30 seconds; and

then freezing the cooled cut meat after removing the cold water which deposits on the surface of the cooled cut meat.

4,714,619

AMINOMALONYL ALANINE COMPOUNDS AS DIETARY SWEETENERS

Herbert H. Seltzman, Raleigh, and Yung-Ao Hsieh, Durham, both of N.C., assignors to Research Triangle Institute, N.C.

PCT No. PCT/US85/01764, § 371 Date May 19, 1986, § 102(e) Date May 19, 1986, PCT Pub. No. WO86/01690, PCT Pub. Date Mar. 27, 1986

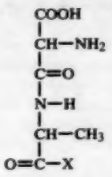
PCT Filed Sep. 18, 1985, Ser. No. 893,551

The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.

Int. Cl.[4] A23L *1/236, 2/38*

U.S. Cl. 426—548 **7 Claims**

1. Aminomalonyl-D-alanine derivatives having the formula:



and pharmaceutically acceptable salts thereof, wherein X is —NHR or —OR with R being alkyl of from 3 to 10 carbon atoms, or $—NH_2$.

4,714,620

SOFT, SUGARLESS AERATED CONFECTIONERY COMPOSITION

Frank J. Bunick, Budd Lake; Sheryl A. Hutchinson, Lake Hiawatha, and Ralph Cifrese, Morristown, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 12, 1986, Ser. No. 941,257

Int. Cl.[4] A23G *3/00*

U.S. Cl. 426—572 **37 Claims**

1. A sugarless chewable aerated confectionery composition which comprises: a hydrogenated starch hydrolysate in an amount of about 35% to about 89%, cellulosics in an amount of about 1% to about 10% wherein the cellulosics are a non-water soluble and a water soluble cellulosic such that the ratio of water soluble to non water soluble cellulosic is about 1:3 to about 3:1, a whipping agent in an amount of about 0.1% to about 7.5%, fat in an amount of about 2% to about 10%, and a final water content of about 7% to about 12%.

4,714,621

COATING METHOD

Carl E. Gullberg, Storvreta, Sweden, assignor to Pharmacia AB, Upsala, Sweden

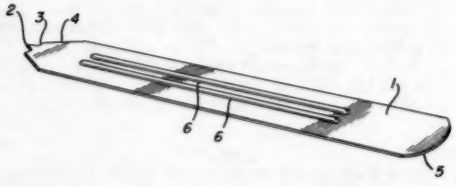
PCT No. PCT/SE86/00157, § 371 Date Dec. 2, 1986, § 102(e) Date Dec. 2, 1986, PCT Pub. No. WO86/06268, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 8, 1986, Ser. No. 946,512

Claims priority, application Sweden, Apr. 24, 1985, 8501990

Int. Cl.[4] A01N *1/02*; B05D *3/12*; A61B *15/00*

U.S. Cl. 427—2 **1 Claim**



1. In a method for applying a coating of allergen on a steel tip of an instrument which is to be employed for in vivo allergy diagnostication and which has stop means adjacent to the steel tip so that solely said tip can penetrate the skin, the improvement that the steel tip plus those portions of the stop means that lie in the immediate proximity of said tip are acid-pickled and then coated with allergen to thus cause an active amount of allergen to adhere to said tip.

4,714,622

BLAST MATERIAL FOR MECHANICAL PLATING AND CONTINUOUS MECHANICAL PLATING USING THE SAME

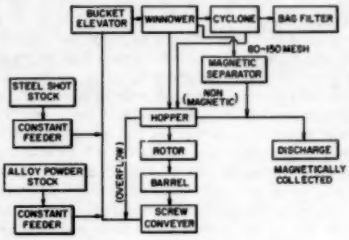
Shigeru Omori; Masatsugu Watanabe, and Fumio Oboshi, all of Okayama, Japan, assignors to Dowa Iron Powder Co., Ltd., Okayama, Japan

Division of Ser. No. 753,879, Jul. 11, 1985, Pat. No. 4,655,832. This application Oct. 27, 1986, Ser. No. 923,475

Claims priority, application Japan, Jul. 30, 1984, 59-157341

Int. Cl.[4] B05D *1/12*

U.S. Cl. 427—11 **4 Claims**



1. A continuous mechanical plating process comprising projecting a blast material consisting of a mixture of 60–970% by weight of steel shot and 10–40% by weight of a coating alloy powder comprising 2.5–50% by weight of Fe and a maximum of 5% by weight of at least one of Al, Cu, Sn, Mg and Si, the balance being Zn and inevitable impurities, said coating alloy powder having an average hardness of 140–450 Hv, onto the surface to be treated, and projecting said blast material repeatedly, characterized in that a magnetic separation step is interposed in the course of repetition of the projecting, whereby fine iron powder produced during blasting is removed from said mixture.

4,714,623

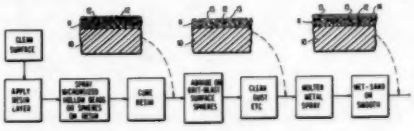
METHOD AND APPARATUS FOR APPLYING METAL CLADDING ON SURFACES AND PRODUCTS FORMED THEREBY

Louis M. Riccio, P.O. Box 81, DeVault, Pa. 19432, and Alexander A. Bosna, 135 Summit Rd., Malvern, Pa. 19355

Division of Ser. No. 706,989, Feb. 28, 1985, Pat. No. 4,618,504, and a continuation-in-part of Ser. No. 563,430, Dec. 20, 1983, Pat. No. 4,521,475, each is a continuation-in-part of Ser. No. 481,412, Apr. 1, 1983. This application Feb. 13, 1986, Ser. No. 829,047

Int. Cl.[4] B05D *1/06, 1/08*

U.S. Cl. 427—27 **22 Claims**



1. In a method of applying an antifouling coating to a marine surface of a metal selected from the group comprising copper and/or copper alloys—such as copper-nickel, the improvement comprising the steps of:

(1) coating said marine surface with a curable adhesive resin,

(2) spraying a layer of inorganic hollow spheres in the size range of greater than 10 microns onto said adhesive resin prior to curing of same,

(3) curing said curable layer,

(4) after step (3), abrading said layer of hollow inorganic spheres to fracture same and produce a matrix of anchor

sites, undercuts, nooks and crannies in the surface thereof, and

(5) thermally spraying molten metal particles on said matrix to fill said undercuts, nooks and crannies with said metal in one or more passes thereof.

4,714,624

HIGH TEMPERATURE OXIDATION/CORROSION RESISTANT COATINGS

Subhash K. Naik, Milford, Conn., assignor to Textron/Avco Corp., Providence, R.I.

Filed Feb. 21, 1986, Ser. No. 831,677
Int. Cl.[4] B05D *1/00, 1/08*
U.S. Cl. 427—34 8 Claims

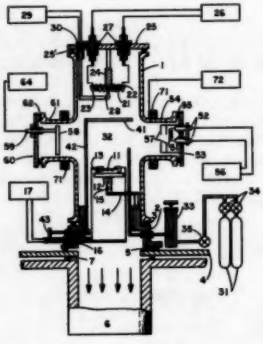
1. A process for manufacturing an individual engine component having a simplified airfoil shape which comprises first aluminide-coating said component; then overcoating same with a MCrAlY composition wherein M is a solid solution of molybdenum and a second metal selected from the group consisting of nickel, cobalt and mixtures thereof, the composition being comprised of from about 0.1 to about 18% by weight of molybdenum, about 30 to about 70% by weight of the second metal, about 10 to about 40% by weight of chromium about 6 to about 20% by weight of aluminum and about 0.01 to about 3% by weight of yttrium; and then subjecting said component to diffusional heat treatment.

4,714,625

DEPOSITION OF FILMS OF CUBIC BORON NITRIDE AND NITRIDES OF OTHER GROUP III ELEMENTS

Kasturi L. Chopra, 16 West Ave., IIT, Hauz-Khas, New Delhi, India; Roitan F. Bunshah, 8138 Zitola Ter., Playa Del Rey, Calif. 90293; Chandra V. Deshpandey, 3426 Jasmine Ave., Los Angeles, Calif. 90036, and Vasant D. Vankar, Dept. of Physics,IIT, Hauz-Khas, New Delhi, India

Filed Aug. 12, 1985, Ser. No. 764,345
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—35 16 Claims



1. A process for depositing a film of a nitride of a Group III element in the periodic table of elements on a substrate, comprising the steps of

supporting the substrate in a vacuum;

evaporating an easily evaporable compound containing a Group III element in the condensed state selected from the group consisting of boric acid and organometallic compounds of aluminum, indium and gallium, by a resistance-heated evaporation source to produce a vapor of said compound or its dissociated products in a zone between the resistance-heated evaporation source and the substrate;

introducing ammonia gas into said zone;

extracting low-energy electrons from a heated emitter by a d.c. electric field directed across the path of said vapor in said zone, which electric field is produced by applying an electric potential between the emitter and the anode of about 20 to 200 volts;

directing a beam of the low-energy electrons laterally through said zone for colliding with the ammonia gas and said vapor to produce ions of ammonia and said vapor and energetic neutral atoms which react with each other and with atoms of ammonia and said vapor in said zone, resulting in a deposit of a nitride of a Group III element on the substrate; and

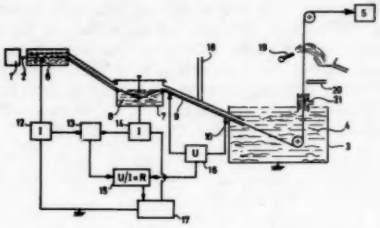
providing a magnetic field surrounding the beam of low-energy electrons so as to increase the collision probability with atoms of the reactants.

4,714,626

PROCESS FOR TREATING CONDUCTIVE PROFILES, PARTICULARLY METALLIC CONDUCTIVE WIRES, THE INSTALLATION FOR CARRYING SAID PROCESS INTO EFFECT, AND TREATED PROFILES SO OBTAINED

André Poncelet, Ville Houdlemont; Hyacinthe Getti, Herserange, and Michel Faugouin, Gorcy, all of France, assignors to Tecnor, Puteaux and Sa "PGF"Procede de Galvanisation de Fils, Gorcy, both of, France

Filed Jan. 15, 1986, Ser. No. 819,224
Claims priority, application France, Jan. 22, 1985, 85 00852
Int. Cl.[4] C23C *2/00, 2/38*
U.S. Cl. 427—49 10 Claims



1. A process for coating continuous elements made of electrically conductive material, comprising:

drawing said elements through a series of stages comprising successively passing said elements through a preliminary degreasing bath of an electrolytic solution, an intermediate contact bath of electrolytically conductive liquid, and a treatment bath of a liquid metal to be deposited on said elements, and bringing said preliminary bath, said intermediate contact bath, and said treatment bath to different voltages making an adjustable heating current circulate along a section of said elements between said intermediate contact bath and said treatment bath and maintaining thereby said treatment bath metal in the liquid state and periodically reversing relative to a first contact at the level of the degreasing bath, the polarity of a second contact, at the level of the contact bath and relative to a third contact, at the level of said treatment bath.

4,714,627

METHOD OF GOLD DEPOSITION USING VOLATILE ORGANOGOLD COMPLEXES

Richard J. Puddephatt, and Ilse Treurnicht, both of London, Canada, assignors to Ontario Development Corp., Ontario, Canada

Continuation-in-part of Ser. No. 676,398, Nov. 29, 1984, abandoned. This application Dec. 17, 1985, Ser. No. 810,322
Int. Cl.[4] B05D *3/06;* C23C *16/06*
U.S. Cl. 427—53.1 13 Claims

1. A method for depositing gold onto a target surface, comprising:

vaporizing an organogold complex under conditions of a dynamic vacuum of at least about 10^{-2} mbar and moderate heating in the range of about 30° C. to about 80° C., said complex having the formula:

$$R—Au^{(I)}—L$$

or

$$R_3Au^{(III)}—L$$

wherein R may be an alkyl, alkenyl, alkynyl, aryl or aralkyl group having up to 12 carbon atoms; and L may be —CNR′ or —PR″$_3$ wherein R′ is a C_{1-6} alkyl, or an aryl or aralkyl group having up to 10 carbon atoms, and R″ is a C_{1-3} alkyl, or aryl;

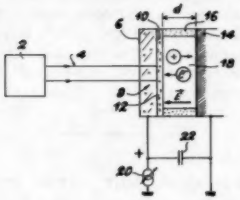
heating the target surface also under a dynamic vacuum of at least about 10^{-2}mbar to at least the temperature of decomposition for the organogold complex, said heating being in the range of about 100° C. to about 250° C.; and

introducing the vaporized complex into contact with the heated target surface while maintaining the vacuum thereby causing decomposition of the complex and deposition of gold onto the target surface.

4,714,628
PROCESS AND APPARATUS FOR TREATING A MATERIAL BY A THERMOIONIC EFFECT WITH A VIEW TO MODIFYING ITS PHYSICOCHEMICAL PROPERTIES

Jean-Francois Eloy, Saint Ismier, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 12, 1987, Ser. No. 13,699
Claims priority, application France, Feb. 25, 1986, 86 02568
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—53.1 **19 Claims**



1. A process for treating a material with a view to modifying its physicochemical properties by ion implantation of at least one dopant, wherein it comprises the following stages:

deposition of a dopant film on a surface of a substrate, positioning of the material facing said film-coated surface, whilst leaving a space between the film and the material, irradiation of the film through the substrate by a pulsed, collimated laser beam having a given wavelength in order to form dopant ions by explosive vaporization of the dopant, the substrate being transparent to said wavelength and, simultaneously producing an electric field in said space for accelerating the dopant ions with a view to their thermoionic implantation in the material.

11. An apparatus for treating a material with a view to modifying its physicochemical properties by the ion implantation of at least one dopant, wherein it comprises:

a substrate having first and second opposite surfaces, the first surface being covered with a dopant film and can be positioned facing the material, whilst maintaining a space between the film and the material,

a source producing a collimated, pulsed laser beam with a given wavelength, directed onto the second surface of the substrate which is transparent to said wavelength, the laser beam being able to interact with the dopant film for forming dopant ions by explosive vaporization of said dopant and

electrical means for producing, simultaneously with the laser pulse, an electric field in said space in order to accelerate the dopant ions with a view to their thermoionic implantation in the material.

4,714,629
METHOD FOR TREATING AGGREGATE MATERIALS WITH WAX AND COMPOSITIONS THEREOF WITH BITUMEN FOR ROAD SURFACES

Benjamin L. Davis; Joseph M. Dixon, both of Essex, and Nicholas D. Page, Kent, all of England, assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 23, 1986, Ser. No. 854,972
Int. Cl.[4] E01C *7/22*; B05D *7/00*
U.S. Cl. 427—138 **10 Claims**

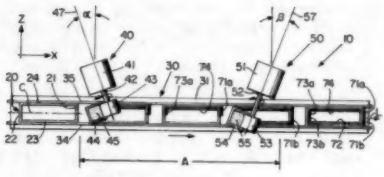
1. A method for imparting hydrophobic properties to stone chippings and other aggregate materials suitable for use in road surfaces, which comprises treating the chippings or aggregate having a size of 3 to 28 mm with an aqueous wax emulsion to at least partially coat the surface of the chippings or aggregate with wax.

10. A composition comprising wax coated aggregate and bitumen binder in which said aggregate has been treated with an aqueous wax emulsion to coat its surfaces at least partially with wax.

4,714,630
METHOD AND APPARATUS FOR APPLYING ADHESIVE TO THE EDGES OF OPEN CONTAINER ENDS

Christopher Carr, and William T. Rembold, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 4, 1986, Ser. No. 848,676
Int. Cl.[4] B05D *5/10*; B05C *1/02*
U.S. Cl. 427—207.1 **22 Claims**



1. An apparatus for applying adhesive to the open end of a container, said container having oppositely disposed, parallel, front and rear wall panels, oppositely disposed side wall panels, said wall panels having distal edges which are coplanar and cooperatively define said open end, and a center line in the plane of said distal edges which is parallel to said front and rear wall panels and aligned with the center of said oppositely disposed side wall panels, said apparatus comprising:

(a) conveying means for moving said container along a line of movement through an adhesive application area of said apparatus, said conveying means including attachment means for substantially immovably supporting said container thereon at least during adhesive application procedures;

(b) an adhesive application area including a pair of rotary adhesive applicators for applying adhesive to said distal edges and portions adjacent said edges, said adhesive applicators each having an outer surface adapted to carry a layer of adhesive and a central axis which is oriented in a non-normal relationship to at least one of said center line and said line of movement of said container such that as said container passes said adhesive applicators, the rotary

adhesive applicators contact said distal edges of said container wall panels; and

(c) rotation control means for maintaining a relative speed differential between the container being moved along said conveying means and the rotating adhesive applicators, whereby contact of said rotating adhesive applicators and the open edges of said container wall panels causes a predetermined amount of adhesive to be deposited on the distal edges and portions adjacent said edges of said open end of said wall panels.

21. A method for applying adhesive to the upper edges and upper portions of the open ends of containers, said containers each having oppositely disposed, parallel, front and rear wall panels, oppositely disposed side wall panels, said wall panels having distal edges which are coplanar and cooperatively define said open end, and a center line in the plane of said distal edges which is parallel to said front and rear wall panels and aligned with the center of said oppositely disposed side wall panels, said method comprising the steps of:

(a) supplying said containers along a conveying means to an adhesive application area along a line of movement established by said conveying means such that the center line of each container is substantially parallel to said line of movement;

(b) conveying said containers through said adhesive application area at predetermined speed, said containers being substantially immovably supported by attachment means on said conveying means at least during the time said containers are being conveyed through said adhesive application area; and

(c) applying adhesive to the distal edges and portions adjacent said edges of said front, rear and side wall panels of said containers by contacting such open edges with two or more rotary adhesive applicators at said adhesive application area, said rotary adhesive applicators rotating at a predetermined speed and each having a central axis of rotation which is oriented in a non-normal relationship to at least one of said center line and said line of movement of such containers, said predetermined speed of such rotary adhesive applicators establishing a relative speed differential with said moving containers such that upon contact between said rotary applicators and the distal edges of a container, adhesive is removed from the applicators and deposited on said container along such distal edges and upper portions of said wall panels.

4,714,631

RAPIDLY REMOVABLE UNDERCOATING FOR VACUUM DEPOSITION OF PATTERNED LAYERS ONTO SUBSTRATES

Brian E. Aufderheide, Cedarburg, Wis., assignor to W. H. Brady Co., Milwaukee, Wis.

Continuation of Ser. No. 770,338, Aug. 28, 1985, abandoned. This application Sep. 29, 1986, Ser. No. 912,650

Int. Cl.[4] C23C *16/00*

U.S. Cl. 427—250 **10 Claims**

1. In the combination of a substrate, a patterned undercoating on a surface of the substrate, and a layer of vacuum deposited material over the patterned layer of undercoating,

the improvement wherein the undercoating comprises a combination of the following ingredients:

(1) a water soluble film-forming polymer consisting of a polymer having a Water Solubility Rate, measured as defined in the specification, in the range of 1 to 10 hours;

(2) a solubility accelerator consisting of a compound compatible with the film-forming polymer and having a Water Solubility Rate, measured as defined in the specification, of 30 minutes or less; and

(3) a solid particular material insoluble in the film-forming polymer and providing a rough surface topology to a dried layer of the undercoating;

the undercoating and vacuum deposited material thereover characterized in being removable from the substrate by washing with water for one minute or less.

4,714,632

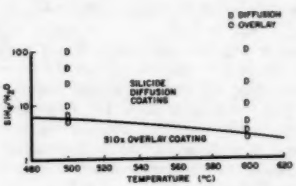
METHOD OF PRODUCING SILICON DIFFUSION COATINGS ON METAL ARTICLES

Alejandro L. Cabrera, Fogelsville; John F. Kirner; Robert A. Miller, both of Allentown, and Ronald Pierantozzi, Orefield, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Dec. 11, 1985, Ser. No. 807,890

Int. Cl.[4] C23C *16/24*

U.S. Cl. 427—255.1 **36 Claims**



1. A method of forming a silicon diffusion coating on the surface of a metal said metal subject formation of a surface oxide that can be reduced by a furnace treatment under controlled atmosphere, the steps comprising:

(a) pretreating said metal by heating said metal under conditions of, temperature less than 1200° C. under a controlled atmosphere reducing to elemental constituents of said metal to reduce or prevent formation of a barrier coating on exposed surfaces of said metal; and

(b) treating said metal under conditions where said metal article can be maintained at a temperature of less than 1000° C. under a controlled atmosphere consisting of silane at least 1 part per million by volume, balance hydrogen or hydrogen and inert gas mixture wherein said atmosphere contains silane to oxygen in a molar ratio greater than 2.5 and oxygen to hydrogen in a molar ratio less than 2×10^{-4} whereby silicon is diffused into the surface of said metal article.

4,714,633

EXPANDING AND SHRINKING MEMBER

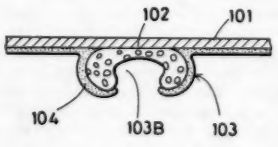
Seinosuke Horiki; Reiji Makino; Kuninori Ito, all of Nagoya, and Tetsuji Unno, Aichi, all of Japan, assignors to Nagoya Oilchemical Co., Ltd., Tokai, Japan

Filed Jun. 1, 1987, Ser. No. 57,012

Claims priority, application Japan, Jun. 3, 1986, 61-084506[U]

Int. Cl.[4] B05D *1/32, 5/00;* **B32B** *7/05*

U.S. Cl. 427—282 **9 Claims**



1. An expanding and shrinking member comprises a panel which consists of a thermoplastic foam having closed cells and (a) cavity(ies) is(are) formed on one side of said panel and an adhesive layer is formed on the other side of said panel.

6. A method of surface treatment comprising attaching the expanding and shrinking member of claim 1 to a part of the surface of an article to be protected from a surface treatment by the adhesive layer of said member effecting said surface

treatment on said surface of the article, and heating said expanding and shrinking member to expand and then shrink and separate from said part of said surface of said article.

4,714,634

PREPARATION OF GRAFT COPOLYMER AND PAINT USE THEREOF

Tadafumi Miyazono; Yoshio Eguchi, both of Osaka; Akiharu Ogino, Tokyo; Haruhiko Sawada, Kanagawa, and Yoshitaka Okude, Osaka, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Mar. 11, 1985, Ser. No. 711,801
Claims priority, application Japan, May 28, 1984, 59-108164
Int. Cl.[4] C08G *63/00*; B05D *3/02, 1/36*; B32B *27/06*
U.S. Cl. 427—409 **3 Claims**

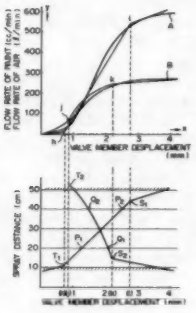
1. A coating composition to be used as a base coat in a 2-coat and 1-bake coating system comprising as a resinous vehicle an acrylic graft copolymer and a crosslinking agent, said acrylic graft copolymer being obtained by reacting a cellulose ester with a mono- or di-ester of an acid selected from the group consisting of a mono-ester of maleic acid, a mono-ester of fumaric acid, a di-ester of maleic acid and a di-ester of fumaric acid so as to chemically combine the cellulose ester and the mono- or di-ester of said acid through an ester bonding and copolymerizing the thus obtained cellulose acetate butyrate bearing a copolymerizable double bonding with other polymerizable monomer(s).

4,714,635

AUTOMATIC SPRAYING METHOD

Takeshi Mochizuki; Katsumasa Iwasawa; Ikuya Shiraishi, all of Kanagawa, and Kazuki Terafuji, Hiroshima, all of Japan, assignors to Iwata Air Compressor Mfg. Co., Ltd., Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,626
Claims priority, application Japan, Sep. 4, 1985, 60-195352
Int. Cl.[4] B05D *1/02*
U.S. Cl. 427—421 **1 Claim**


FLOW RATE OF PAINT (cc/min)
FLOW RATE OF AIR (l/min)
VALVE MEMBER DISPLACEMENT (mm)
SPRAY DISTANCE (cm)
VALVE MEMBER DISPLACEMENT (mm)

1. An automatic spraying method wherein the amount of displacement of a valve member is calculated from data representing a particular spray distance by means of a microcomputer, and the valve member is activated on the basis of the displacement amount thus obtained, said method comprising the steps of:

experimentally obtaining in advance a curve representing the relationship between the valve member displacement amount and the flow rate of a fluid which is to be jetted out;

approximating said curve by a plurality of straight lines or parabolas to define a plurality of sections, obtaining the respective positions of the boundary points of these straight lines or parabolas and the slopes or average slopes thereof, and calculating the ratio between the respective slopes of the sections which are adjacent to each other;

carrying out trial spraying at two different spray distances within a range of valve member displacement amounts included in one section so as to provide a desired coating, and obtaining the relationship between the spray distance and the valve member displacement amount which provides coatings similar to each other at two points; and

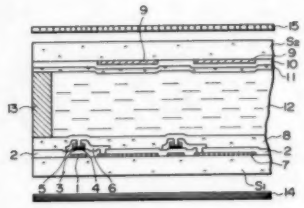
determining an equation of a straight line or a curve in said section by means of said microcomputer on the basis of data concerning said two points and data which determines said section to be a straight line or a parabola, determining an equation of a straight line or a curve in a section which is adjacent to said section from the equation already obtained and said slope ratio, storing these equations in memory means, and calculating a valve member displacement amount for input data representing a particular spray distance on the basis of said stored equations.

4,714,636

LIQUID CRYSTAL DEVICE FOR COLOR DISPLAY

Koujiro Yokono, Yokohama; Masaru Kamio, Atugi, and Yukitoshi Ohkubo, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 12, 1985, Ser. No. 722,397
Claims priority, application Japan, Apr. 20, 1984, 59-79891
Int. Cl.[4] C09K *3/34*
U.S. Cl. 428—1 **5 Claims**



1. A liquid crystal device for color display, comprising:

a pair of oppositely spaced base plates having facing surfaces;

a liquid crystal disposed between the facing surfaces of the base plates so as to form a plurality of picture elements;

a plurality of color filters formed on the facing surface of one of the base plates so as to provide each picture element with a color filter; each individual color filter having a blue, green or red color; and

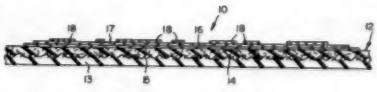
a transparent electrode formed on the plurality of color filters; each of said color filters comprising a vapor-deposited colorant layer of an organic pigment; said colorant layer having a thickness of about 1,000 angstroms to 1 micron.

4,714,637

RADIANT HEAT RESISTANT STENCILIBLE INFLATABLE AND METHOD

Hildreth W. Stevenson, Medina, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed May 23, 1986, Ser. No. 866,533
Int. Cl.[4] B32B *3/06*
U.S. Cl. 428—35 **4 Claims**



1. In a radiant heat resistant inflatable structure, a stenciling

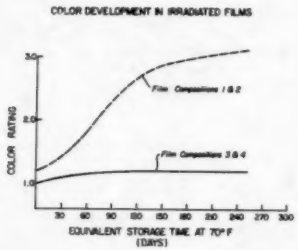
zone comprising: at least one ply of a structural fabric integral with a structural fabric ply of the inflatable structure having one aluminum coating thereover, and at least one thickness of an aluminum paint thereover, the aluminum paint having an aluminum content at least sufficient in the number of coats applied over the structural fabric to preclude for 90 seconds air loss as a result of heat damage from stenciling applied thereover when tested in accordance with FAA/TSO-69A, Appendix II.

4,714,638

IRRADIATED MULTILAYER FILM FOR PRIMAL MEAT PACKAGING

Stanley Lustig, Park Forest; Jeffrey M. Schuetz, Woodridge, and Stephen J. Vicik, Darien, all of Ill., assignors to Viskase Corporation, Chicago, Ill.

Filed Jun. 14, 1985, Ser. No. 744,680
Int. Cl.[4] B32B *27/08*
U.S. Cl. 428—35 **58 Claims**



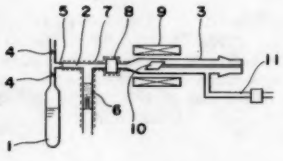
1. a heat-shrinkable, biaxially stretched multilayer film suitable for packaging primal and sub-primal meat cuts and processed meats, said film containing a barrier layer comprising a vinylidene chloride-methyl acrylate copolymer containing from about 5 to about 15 weight percent of methyl acrylate, based on the weight of said copolymer.

4,714,639

METHODS AND MATERIALS FOR THERMOELECTRIC AND LIGHT-HEAT CONVERSION

Yoshiyuki Higashigaki, Kashiwa; Yoshikazu Yoshimoto, Tenri; Tomonari Suzuki, Kashihara; Shigeo Nakajima, Nara, and Toshio Inoguchi, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 20, 1986, Ser. No. 841,829
Claims priority, application Japan, Mar. 22, 1985, 60-59276; Mar. 26, 1985, 60-64571
Int. Cl.[4] B27N *5/02*; C01B *31/04*; C09C *1/56*
U.S. Cl. 428—36 **14 Claims**



1. A material capable of converting light energy into heat energy comprising:

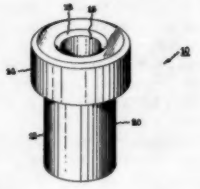
a hollow light transmissive member having a thin carbon layer adhered to the inner surface of the hollow member, said layer having a translucent mirror metallic luster characteristic.

4,714,640

(ALUMINA ELECTRICALLY CONDUCTIVE) GUIDE ARTICLE

Charles G. Morgan, Laurens, S.C., assignor to General Electric Co., N.Y.

Filed Feb. 4, 1986, Ser. No. 826,165
Int. Cl.[4] C04B *35/10*
U.S. Cl. 428—36 **3 Claims**



1. An alumina based electrically conductive ceramic guide article to remove the static electricity charge from continuously moving textile and synthetic organic polymer filaments and tapes when placed in physical contact with said guide article comprising a polished body of sintered polycrystalline alumina ceramic material having a central opening through which the filamentary material is transported which further includes a radiused contour at both ends of said opening, said ceramic material having a rounded grain size not to exceed about 4.0 microns average diameter together with electrical resistivity not to exceed about 1×10^8 ohm-centimeters, and said ceramic material also consisting essentially of in approximate weight percent based on the starting batch formulation at least 94% Al_2O_3, 1–4.5% TiO_2 and at least one component selected from the group consisting of MnO_2, Fe_2O_3 or mixture thereof wherein the amount of MnO_2 and Fe_2O_3 present ranges from 0–4% and 0–3%, respectively.

4,714,641

FERROMAGNETIC FILMS FOR HIGH DENSITY RECORDING AND METHODS OF PRODUCTION

Bernhard F. Cordts, Topsfield, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.

Division of Ser. No. 561,692, Dec. 15, 1983, Pat. No. 4,520,040. This application Mar. 4, 1985, Ser. No. 707,995
Int. Cl.[4] B22D *25/00*
U.S. Cl. 428—610 **4 Claims**

1. A ferromagnetic film comprising:

a metallic substrate material having low solubility for a selected ferromagnetic material; and

a plurality of particles of said selected ferromagnetic material in the surface layer of said substrate, said particles having a maximum dimension in the range between 50 and 500 Angstroms.

4,714,642

CARBON FIBER MULTIFILAMENTARY TOW WHICH IS PARTICULARLY SUITED FOR WEAVING AND/OR RESIN IMPREGNATION

J. Eugene McAliley, Rock Hill, S.C.; Gene P. Daumit, Charlotte; Frederick A. Ethridge, Waxhaw, both of N.C., and James R. Crozier, Jr., Rock Hill, S.C., assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 647,739, Sep. 6, 1984, abandoned, which is a continuation-in-part of Ser. No. 527,728, Aug. 30, 1983, Pat. No. 4,534,919. This application Jun. 27, 1985, Ser. No. 748,781
Int. Cl.[4] B32B *5/12*
U.S. Cl. 428—113 **63 Claims**

1. A multifilamentary tow of carbonaceous fibrous material which is particularly suited for use as fiber reinforcement in a resin matrix comprising approximately 1,000 to 50,000 adjacent

substantially continuous filaments containing at least 70 percent carbon by weight having a length of at least 100 meters, wherein the individual filaments of said multifilamentary tow are randomly decollimated and commingled with numerous filament cross-over points throughout the length of the multifilamentary tow so as to create a multitude of interstices be-

tween adjacent filaments which are well adapted to receive and retain a matrixforming resin as evidenced by an ability of the filaments of said multifilamentary tow when subjected to the flaring test described herein while in a substantially untwisted state to resist lateral expansion to a width which is as much as three times the original width as a result of said commingling of adjacent filaments.

4,714,643

DETERGENCY BOOSTER CLOTHS AND DISPENSER THEREFOR

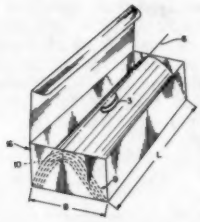
Werner Kuenzel, Langenfeld, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 818,570, Jan. 13, 1986, Pat. No. 4,648,510. This application Oct. 21, 1986, Ser. No. 921,667

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1985, 3500936

Int. Cl.[4] B65D *79/00, 83/08, 85/62;* **C11D** *17/06*

U.S. Cl. 428—131 **6 Claims**



1. A detergency booster cloth adapted for easy removal from a dispensing container in which a plurality of said cloths are disposed in a stacked arrangement, said booster cloth comprising a sheet of a material which dissolves in water under laundering conditions and which contains releasable active detergency boosters, said sheet containing a curved incision therethrough to facilitate grasping the sheet when said sheet is disposed in said container in such a manner that the sheet is held in convex flexure in the area containing said incision.

4,714,644

SANDING PAD

Larry D. Rich, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 30, 1986, Ser. No. 947,695

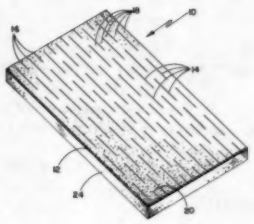
Int. Cl.[4] B24D *11/00;* **B32B** *3/10, 5/18*

U.S. Cl. 428—136 **6 Claims**

1. A sanding pad particularly useful for simultaneously sanding intersecting surfaces at a corner, said pad comprising:

a rectangular backing sheet having first and second surfaces and having through slits along closely spaced parallel lines, with said slits along each line forming most of said line and being spaced by a plurality of unslit parts of said sheet;

a coating of abrasive granules adhered along said first surface; and



a layer of resiliently compressible foam adhered on and coextensive with the second surface of said backing sheet, said foam having sufficiently low density to afford bending said backing sheet at about a right angle along one of said lines to deform said foam adjacent the line about which said sheet is bent while retaining in generally planar condition the two portions of said sheet on opposite sides of the line about which the sheet is bent.

4,714,645

ELECTRONIC PARTS AND PROCESS FOR THE MANUFACTURE OF THE SAME

Shinroku Kawasumi, Kamakura, Japan, assignor to Mitsubishi Mining & Cement Co., Ltd., Tokyo and Kawasumi Laboratories, Inc., Kamakura, both of, Japan

Continuation of Ser. No. 693,827, Jan. 23, 1985, abandoned, which is a continuation of Ser. No. 433,956, Oct. 13, 1982, abandoned. This application Jul. 7, 1986, Ser. No. 883,290

Claims priority, application Japan, Oct. 20, 1981, 56-166335

Int. Cl.[4] B32B *5/16;* **B05D** *3/02*

U.S. Cl. 428—209 **17 Claims**

1. An electronic component comprising a ceramic substrate having at least a portion of said substrate coated with a fired electroconductive precious metal-containing electrode layer,

said electrode layer having a surface thereof which consists essentially of said electroconductive precious metal, said electrode layer further comprising a plurality of microgranular ceramic particles having an average diameter of not greater than 1 micron which particles have been coated with said electro-conductive precious metal and fired, said particles being in metal-to-metal contact whereby the surface portions of the outer surface layer of said fired particles form said surface of said electrode layer, said ceramic particle portion of said electrode layer consisting of from 90 to 10% by weight of said electrode layer.

4,714,646

ELECTROPHORETIC INSULATION OF METAL CIRCUIT BOARD CORE

David L. Fletcher, Georgetown, and Arthur E. Graham, Lexington, both of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 842,978, Mar. 24, 1986, abandoned. This application Jun. 17, 1987, Ser. No. 60,962

Int. Cl.[4] B32B *3/00;* **B05D** *5/12*

U.S. Cl. 428—204 **4 Claims**

1. A printed circuit comprising a metal sheet with via holes for electrical connection between opposite surfaces of said sheet, said sheet being electrically insulated at said opposite surfaces and in said via holes by a continuous coating, formed

without etching said holes to create an overhang of said coating, of electrically insulating organic resin containing fumed silicon dioxide thoroughly dispersed within said resin in an amount of about 2 percent to about 10 percent by weight of said fumed silicon dioxide to the weight of said resin, part of the circuitry of said printed circuit comprising a metal coated on said resin and silicon dioxide coating.

4,714,647

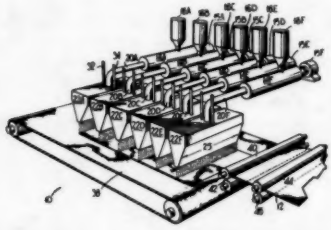
MELT-BLOWN MATERIAL WITH DEPTH FIBER SIZE GRADIENT

Peter W. Shipp, Jr., Woodstock, and Clifford M. Vogt, Roswell, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed May 2, 1986, Ser. No. 858,995

Int. Cl.[4] B32B *7/02*

U.S. Cl. 428—212 **8 Claims**



5. A filter medium comprising a composite web of meltblown thermoplastic fibers, the web having a fiber size gradient across its depth, wherein the gradient results from sequentially depositing and interbonding a number of layers of meltblown thermoplastic fibers having the same composition but different sizes onto a collector.

4,714,648

PREPREGS AND METHOD FOR PRODUCTION THEREOF

Yasuhisa Nagata, Shizuoka, Japan, assignor to Toho Rayon Co., Ltd., Tokyo, Japan

Filed Aug. 1, 1985, Ser. No. 761,290

Claims priority, application Japan, Aug. 1, 1984, 59-160211; Aug. 8, 1984, 59-164898

Int. Cl.[4] B32B *7/00*; D04H *1/08*; D02G *3/00*

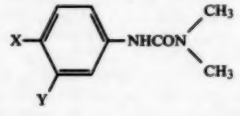
U.S. Cl. 428—245 **18 Claims**

1. A prepreg obtained by impregnating fibers with an epoxy resin composition by a hot melt method, wherein the epoxy resin composition comprises components (A), (B) and (C), wherein

(A) is an epoxy resin,

(B) is a hardening agent composition consisting of a hydrazide type hardening agent for an epoxy resin, and having a melting point of not higher than 160° C., and (B) further contains at least one compound selected from the group consisting of alcohols and phenols having a melting point of not less than 50° C., and

(C) is a urea compound represented by the formula



wherein X and Y each represents H, Cl, and OCH_3.

4,714,649

CARBONIZABLE FABRICS OF ACTIVATED, CARBONIZED FIBERS AND DIFFERENTLY ACTIVATED OR UNACTIVATED FIBERS

William Edwards, Runcorn, England, assignor to C.C. Developments, Limited, London, England

Filed Dec. 13, 1984, Ser. No. 681,384

Claims priority, application United Kingdom, Dec. 29, 1983, 8334560

Int. Cl.[4] B32B *7/00*

U.S. Cl. 428—257 **16 Claims**

1. An activated carbon fabric comprising first, activated, carbonised fibre and second, differently activated or unactivated fibre said firsdt and second fibres being derived from diffrent precursors, said second fibre being derived from a fibre preoxidised and formed with the precursor for the first fibre into a fabric which is then subjected to carbonisation and activation treatment.

4,714,650

STAINPROOF, FLAME-RESISTANT COMPOSITE SHEET MATERIAL

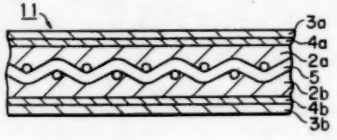
Tsutomu Obayashi, Tokyo; Kazuhide Ino, Souka; Yoshiji Hiraoka, Musashino, and Saburo Baba, Nagarevama, all of Japan, assignors to Hirsoka & Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1986, Ser. No. 914,374

Claims priority, application Japan, Jan. 29, 1985, 60-13445; Feb. 14, 1985, 60-25240; Jun. 4, 1985, 60-119671; Jun. 4, 1985, 60-119672; Jun. 28, 1985, 60-140412; Jun. 29, 1985, 60-141523; Aug. 12, 1985, 60-175655; Aug. 12, 1985, 60-175656; Aug. 12, 1985, 60-175657; Aug. 17, 1985, 60-180039; Aug. 20, 1985, 60-181076; Aug. 28, 1985, 60-187178

Int. Cl.[4] B32B *7/00, 3/10*

U.S. Cl. 428—265 **16 Claims**



1. An improved composite sheet material comprising:

(a) at least one stainproof surface layer containing at least one synthetic thermoplastic polymeric material having a high stain-resistance and weathering resistance selected from the group consisting of polyacrylic polymer resin materials and fluorine-containing polymer resin materials; and

(b) at least one silicone polymer layer containing at least one member selected from the group consisting of silicone resins and silicone rubber, and having a surface portion thereof modified by means of a corona discharge treatment, through which resultant corona discharge-treated surface portion, the silicone polymer layer is bonded to the stainproof surface layer.

4,714,651

ELASTIC ROOFING AND SEALING MATERIALS

Ludwig Hartmann, and Ivo Ruzek, both of Kaiserslautern, Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Continuation of Ser. No. 537,855, Sep. 30, 1983, abandoned, which is a continuation of Ser. No. 343,110, Jan. 27, 1982, abandoned. This application May 20, 1985, Ser. No. 736,419
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1981, 3145266
Int. Cl.[4] B32B 27/02
U.S. Cl. 428—286 12 Claims

1. A high strength elastic roofing and sealing material comprising at least one nonwoven bonded organic fabric carrier layer comprising up to about 25% of thermoplastic bonding fibers, said carrier layer being bonded through the use of thermal calendering followed by the application of a copolymer dispersion, said bonded carrier layer having a coating of bitumen on both sides thereof such that the carrier layer is impregnated with bitumen, wherein the carrier layer possesses the following characteristics:

(a) an area weight of from about 50–350 g/m^2, and;

(b) a permanent residual deformation after relaxation $\epsilon\infty$, in the temperature range of between −20° C. to +70° C. in the range of a forced deformation elongation caused by a stress ϵ_s of 0.03% to 0.30%, the value of which is given by:

$$\epsilon\infty \cong 29.6226 \cdot \epsilon_s^3 - 15.5418 \cdot \epsilon_s^2 + 2.9359 \cdot \epsilon_s - 0.0769.$$

4,714,652

PROCESS FOR FIRE-PROOFING POROUS SYNTHETIC SHEET MATERIAL PARTICULARLY ARTIFICIAL LEATHER

Giorgio Poletto, Cirié, Italy, assignor to Lorica S.p.A., Italy

Continuation-in-part of Ser. No. 741,283, Jun. 4, 1985, abandoned. This application Aug. 15, 1986, Ser. No. 898,817
Claims priority, application Italy, Jun. 6, 1984, 67584 A/84
Int. Cl.[4] B05D 5/00; B32B 5/14, 27/00, 27/40
U.S. Cl. 428—308.4 11 Claims

1. A process for fireproofing porous synthetic sheet material comprising a porous polyurethane matrix and a compact polyurethane resin film, said process comprising the steps of:

treating said sheet material with a fireproofing solution consisting of a solution of water and 24% up to 60% by weight of any fireproofing/retarding substance, preferably of the type employed in extinguishing forest fires, containing ammonium salts, in such a manner as to permeate the entire section of said sheet material;

and then treating said sheet material with a softening solution consisting of a solution of water and 8% up to 20% by weight of any softening substance, preferably of the type employed in softening laundry, containing a linear hydrocarbon chain of about 12 up to 18 carbon atoms coupled with a radical selected from the group consisting of —SO_3X wherein X is an alkali metal, and —$(OCH_2CH_2)_yOH$ wherein y is an integer comprised between 1 and 18; in said softening solution being added an appropriate amount of the same fireproofing/retarding substance contained in said fireproofing solution.

9. Artificial leather for manufacturing clothing, shoes, upholstery and similar, treated according to the fireproofing process of claim 1.

4,714,653

METALLIZABLE SUBSTRATE COMPOSITES AND PRINTED CIRCUITS PRODUCED THEREFROM

Robert Cassat, Ternay, France, assignor to Rhone-Poulenc Recherches, Courbevoie, France

Continuation of Ser. No. 666,036, Oct. 29, 1984, abandoned. This application Feb. 2, 1987, Ser. No. 11,359
Claims priority, application France, Oct. 28, 1983, 83 17507
Int. Cl.[4] C08K 9/06; C09J 5/00
U.S. Cl. 428—328 26 Claims

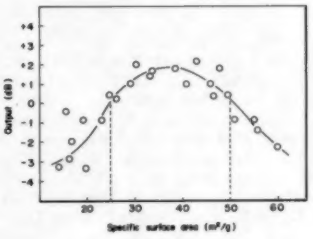
1. A substrate composite, including a central core layer comprising fibrous cellulosic material or flaked mica within a matrix of a thermosetting resin binder, said central core element having coextensively laminated to at least one of the face surfaces thereof, a lamina of a thermosetting resin comprising a particulate array of non-conductive metal oxide filler material distributed therethrough, at least a portion of said metal oxide being borohydride reduced to form unstable metal hydride intermediates into the depth of said lamina.

4,714,654

MAGNETIC RECORDING MEDIUM

Takeo Ito; Hajime Takeuchi, both of Yokohama; Minoru Hashimoto, Kawasaki, and Tatsumi Maeda, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Dec. 19, 1984, Ser. No. 683,582
Int. Cl.[4] C04B 35/26; G11B 5/68, 5/70
U.S. Cl. 428—328 16 Claims



1. A magnetic recording medium comprising a hexagonal crystalline system ferromagnetic powder having a specific surface area of 25 to 50 m^2/g and an average grain diameter in the range of 0.02 to 0.2 μm, said powder being dispersed in a resinous binder, wherein said binder is present with said ferromagnetic powder in a blending proportion that is adjusted to the range of 10 to 40 parts by weight of the binder based on 100 parts by weight of the ferromagnetic powder.

4,714,655

PRESSURE-SENSITIVE ADHESIVE CONTAINING HEAT-SENSITIVE MATERIALS, AND METHOD OF MAKING THE SAME

Binoy K. Bordoloi, Covina; Yehuda Ozari, Arcadia, both of Calif., and Gerald R. Dever, Mentor, Ohio, assignors to Avery International Corporation, Pasadena, Calif.

Filed Oct. 4, 1985, Ser. No. 784,521
Int. Cl.[4] B05D 3/06
U.S. Cl. 428—345 26 Claims

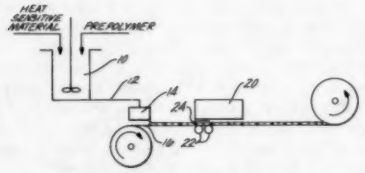
1. A process for the production of a pressure-sensitive-adhesive stock containing a heat-sensitive material which comprises:

(a) forming a mixture of a select amount of at least one heat-sensitive material in a fluid prepolymer, said mixture having a viscosity sufficient to enable casting of the mixture onto a substrate, said prepolymer being polymerizable when subjected to the action of ultraviolet radiation, electron-beam radiation, or a combination thereof, and

substantially non-deleteriously reactive with said heat-sensitive material;

(b) casting said mixture onto a substrate; and

(c) exposing said cast mixture to the radiant action of ultraviolet radiation, electron-beam radiation, or a combination thereof, for a time sufficient to convert said prepolymer into a pressure-sensitive adhesive containing a releasable amount of said heat-sensitive material.



23. A pressure-sensitive-adhesive stock comprising a face material and a pressure-sensitive adhesive containing a heat-sensitive material, said pressure-sensitive adhesive being formed by polymerizing a thin layer of a mixture of at least one heat-sensitive material in a fluid prepolymer onto a substrate, and exposing the mixture to the action of ultraviolet radiation, electron-beam radiation, or a combination thereof, for a time sufficient to convert the fluid prepolymer into a pressure-sensitive adhesive containing a releasable amount of the heat-sensitive material.

4,714,656

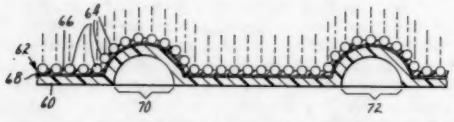
SHEET CONTAINING CONTOUR-DEPENDENT DIRECTIONAL IMAGE AND METHOD FOR FORMING THE SAME

Thomas I. Bradshaw, Afton; Bruce D. Orensteen, and Jack E. Cook, both of St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 778,866, Sep. 23, 1985, abandoned. This application Dec. 19, 1986, Ser. No. 944,458

Int. Cl.[4] B32B *9/04*; **G03C** *3/00*; **B65D** *33/14*

U.S. Cl. 428—411.1 **29 Claims**



1. A contour-dependent, directionally imaged sheet which comprises:

(A) a monolayer of closely spaced transparent microlenses,

(B) means for securing said microlenses to said sheet in a monolayer arrangement; and

(C) a set of axial markings, each axial marking being located at the rear of a microlens such that the set of said axial markings is visible from the front of the sheeting an intact image only when said sheet is in substantially a predetermined nonplanar contour and is viewed within a predetermined conical field of view.

19. A method comprising:

(A) arranging into a nonplanar contour a sheeting comprising a monolayer of closely spaced transparent microlenses and a means for securing said microlenses to said sheeting in a monolayer arrangement; and

(B) directing highly collimated light in an imagewise fashion at a selected angle of incidence to the face of the sheeting to form an axial marking at the rear of each microlens which said light strikes, which markings compose a set of axial markings which is visible as an intact image only when said sheet is in substantially said nonplanar contour and is viewed within a conical field of view, the central axis of which is the angle of incidence of the irradiation.

4,714,657

MELAMINE BASED PROTECTIVE COATINGS FOR THERMOPLASTIC SUBSTRATES

Clayton B. Quinn; Richard R. McClish, and James E. Moore, all of Mount Vernon, Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Apr. 18, 1985, Ser. No. 724,841

Int. Cl.[4] B32B *27/36*

U.S. Cl. 428—412 **9 Claims**

1. A composite comprising a thermoplastic polycarbonate substrate having applied to at least one surface thereof a water, mar- and solvent-resistant coating comprising the reaction products of:

(a) an aminoplast derived component; and

(b) a polyester polyol consisting essentially of the reaction products of diacids and diols wherein said diacids comprise at least 50% by number aliphatic diacids in which the carboxylic acid groups are separated by at least two intervening carbon atoms, said diols comprise at least 50% by number aliphatic diols in which the carbon atoms containing hydroxyl groups are separated by at least two intervening carbon atoms, and wherein the hydroxyl number is from about 50 to about 175.

4,714,658

METHOD FOR TREATING POLYMER SURFACES BY CORONA DISCHARGE AND THEN WITH REDUCING AGENT AND RESULTING ARTICLE

Marjory A. Kadash, Roswell, Ga., and Frederick C. Schwab, Metuchen, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 30, 1985, Ser. No. 814,715

Int. Cl.[4] B32B *27/32*

U.S. Cl. 428—523 **18 Claims**

1. A method of treating polymer articles which are capable of being surface oxidized under corona discharge conditions comprising the steps of:

(a) subjecting the articles to corona discharge sufficient to introduce surface oxygen containing groups including hydroperoxide groups; and

(b) immediately thereafter subjecting the article to a treatment with an alkali metal iodide or an alkaline earth metal iodide to convert at least some of said hydroperoxide groups to hydroxyl groups.

4,714,659

THERMAL PROTECTIVE SHIELD

Hakan Lindgren, and Björn Anderson, both of Hallstahammar, Sweden, assignors to Bulten-Kanthal AB, Hallstahammar, Sweden

PCT No. PCT/SE83/00485, § 371 Date Aug. 27, 1984, § 102(e) Date Aug. 27, 1984, PCT Pub. No. WO84/02763, PCT Pub. Date Jul. 19, 1984

PCT Filed Dec. 29, 1983, Ser. No. 645,742

Claims priority, application Sweden, Dec. 30, 1982, 8207507

Int. Cl.[4] B32B *15/00*

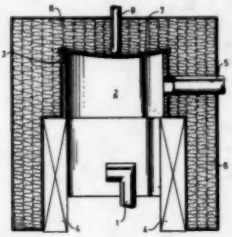
U.S. Cl. 428—685 **4 Claims**

1. A thermal protective shield for protection against hot gases at high operating temperatures comprising at least two layers of which an outer layer for facing the hot gases consists of an alloy containing iron, chromium, and aluminum, characterized in that:

two of said layers consist of plates which are intimately joined together all over a surface corresponding to the entire surface subject to exposure to hot gases;

the outer plate has a thickness of at least about 1 mm and consists of 15–25 weight % chromium, 3–8 weight %

aluminum, no more than a total of about 2% of other substances as additives or impurities, and the rest iron; and



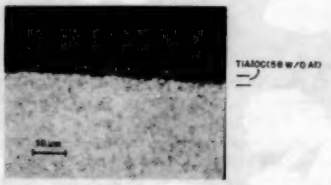
the plate joined to said outer plate consists of a metal alloy having high mechanical strength at high temperatures.

4,714,660

HARD COATINGS WITH MULTIPHASE MICROSTRUCTURES

Alfred S. Gates, Jr., Lindenhurst, Ill., assignor to Fansteel Inc., North Chicago, Ill.

Filed Dec. 23, 1985, Ser. No. 812,455
Int. Cl.⁴ B24D *11/00*; B32B *15/04*; C04B *41/32*
U.S. Cl. 428—698 **15 Claims**



1. A surface-coated article for cutting and wear applications comprising:

(a) a substrate selected from the group consisting of cemented carbide, hard metals and high-temperature ceramics, and

(b) a first chemical vapor deposition coating on said substrate comprised of a composite layer of at least two simultaneously co-deposited phases, a first of said phases being selected from the group consisting of: a carbide, carbonitride, nitride, oxycarbide, oxycarbonitride, silicide or boride of titanium, zirconium, hafnium, vanadium, niobium and tantalum; a carbide, silicide or boride of chromium, molybdenum and tungsten; and a carbide or nitride of silicon and boron; and a second of said phases being selected from the group consisting of an oxide or oxynitride of aluminum, titanium, zirconium, hafnium, magnesium, silicon and calcium, or stabilized zirconium oxide; said co-deposited phases comprising at least one phase present in fiber, rod-like or columnar form oriented with longitudinally axes in a direction normal to the substrate/coating interface in said composite layer.

4,714,661

MOLTEN CARBONATE FUEL CELL

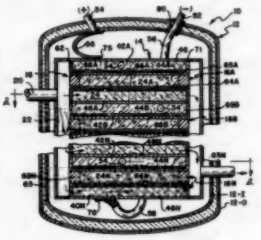
Thomas D. Kaun, New Lenox, and James L. Smith, Lemont, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 8, 1986, Ser. No. 883,217
Int. Cl.⁴ H01M *8/04, 2/08*
U.S. Cl. 429—14 **4 Claims**

1. A molten-electrolyte fuel cell device including a vertical, stacked array of individual fuel cells having at least four major vertical surfaces with vertical edge sections joining the vertical surfaces, the cells including anode and cathode electrodes separated by electrolyte material with the respective electrodes of all the cells being exposed along opposite and common vertical surfaces to provide access to fuel or oxidant gases and removal of waste gases therefrom, said fuel cell device comprising:

an array housing enclosing the array and having vertical sides cooperating with the edge sections of the array in a sealing relationship to define at least four isolated gas manifolds,

a plurality of electrode holders arranged in spaced pairs, each of said electrode holders including a generally planar inner perforated section and first and second pairs of facing transverse laterial edge portions, said first pair of transverse lateral edge portions each having a plurality of



apertures therein, wherein the inner perforated sections of adjacent pairs of electrode holders are in generally parallel alignment and the transverse lateral edge portions of adjacent pairs of electrode holders are directed away from one another;

spacer means disposed between and in contact with adjacent pairs of electrode holders for defining a substantially closed space within which is disposed the electrolyte;

dry sealing means disposed between and in sealed contact with said spacer means and adjacent pairs of electrode holders for confining the electrolyte between an adjacent pair of electrode holders; and

means including first and second manifolds for providing fuel and oxidant gases respectively to said anode and cathode electrodes and third and fourth manifolds for removing waste gases respectively from said anode and cathode electrodes.

4,714,662

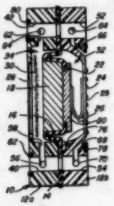
POWER MODULE ASSEMBLY OF ELECTROCHEMICAL CELLS

William R. Bennett, North Olmsted, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 862,613, May 12, 1986, abandoned. This application Mar. 17, 1987, Ser. No. 27,061
Int. Cl.⁴ H01M *12/06*
U.S. Cl. 429—27 **10 Claims**

1. A power module of the type including a plurality of power cells arranged in alongitudinal stacked relation, each power cell including a frame, a gas-consuming cathode mounted at one end of the frame, a consumable anode, a flexible diaphragm mounting the anode in the frame to provide for longitudinal and angular movement of the anode as the anode is consumed, the flexible diaphragm cooperating with the frame to define a sealed expansion chamber on the side of the anode opposite the cathode, first means for introducing fluid under pressure into the expansion chamber to bias the anode toward the cathode, the flexible diaphragm cooperating with the frame to define a sealed flow passage between the anode and the cathode, second means for introducing electrolyte into

the flow passage, means spacing and sealing adjacent cell frames providing separate passage means for soluble gas to the



gas-consuming cathode, and third means for introducing soluble gas into the separate passage means.

4,714,663

SULFONATED POLYSULFONE BATTERY MEMBRANE FOR USE IN CORROSIVE ENVIRONMENTS

Charles Arnold, Jr., and Roger Assink, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 14, 1986, Ser. No. 918,194
Int. Cl.[4] H01M *6/24*
U.S. Cl. 429—101 **20 Claims**

1. In a device for the production of electrical energy by electrochemical methods, which device contains an electrolyte and a membrane separating two electrolyte solutions, the improvement wherein the membrane is an oxidative resistant, conductive, ion-selective membrane comprising a catenated aromatic polymer having an absence of tertiary hydrogens.

4,714,664

ELECTRICAL BATTERY

Mads A. Laustsen, Valby, and Karen Kümmel, Lyngby, both of Denmark, assignors to A/S Hellesens, Koge, Denmark

Filed May 29, 1986, Ser. No. 868,796
Claims priority, application Denmark, Jun. 17, 1985, 2732/85
Int. Cl.[4] H01M *6/14*
U.S. Cl. 429—105 **2 Claims**

1. An electrical battery with a non-aqueous electrolyte/cathode comprising thionyl chloride or sulfuryl chloride and a metal salt dissolved therein and with an anode of metal from group 1 or 2 of the Periodic Table or alloys of these, characterized in that the electrolyte contains the added stabilized SO_3 compound $C_5H_5N{:}SO_3$ (pyridine sulfer trioxide) in an amount effective to improve the delayed action properties of the electrical battery.

4,714,665

SECONDARY BATTERY

Sanford A. Siegel, Baton Rouge, and Stephen A. Noding, Brusly, both of La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 23, 1986, Ser. No. 945,918
Int. Cl.[4] H01M *4/60*
U.S. Cl. 429—192 **20 Claims**

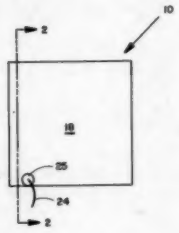
1. A secondary battery which comprises:

(a) an ionically and electronically conductive first polymer film having substantially uniformly distributed therewithin an electrochemical species which contributes to the ionic conductivity of said first polymer film and which is electrochemically reduced when said battery is being discharged and electrochemically oxidized when said battery is being charged;

(b) an ionically and electronically conductive second polymer film having substantially uniformly distributed therewithin an electrochemical species which contributes to the ionic conductivity of said second polymer film and which is electrochemically oxidized when said battery is being discharged and electrochemically reduced when said battery is being charged; and

(c) an ionically conductive third polymer film in contact with said first and said second polymer films, said third polymer film comprising,

(i) a polymer,



(ii) a plasticizer for said polymer, and

(iii) an electrolyte for said battery, which electrolyte is disassociatingly solubilized in said plasticizer, said plasticizer and the solubilized electrolyte being substantially uniformly distributed within said polymer, said ionically conductive third polymer film being substantially electronically non-conductive under discharging voltages and electronically conductive under charging voltages.

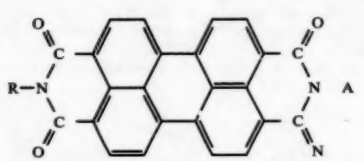
4,714,666

PERYLENE TETRACARBOXYLIC ACID IMIDE PIGMENTS IN AN ELECTROPHOTOGRAPHIC RECORDING MATERIAL

Wolfgang Wiedemann, Geisenheim-Johannisberg; Ernst Spietschka, Idstein, and Helmut Troester, Koenigstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 23, 1986, Ser. No. 888,496
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526249
Int. Cl.[4] G03G *5/06*
U.S. Cl. 430—59 **16 Claims**

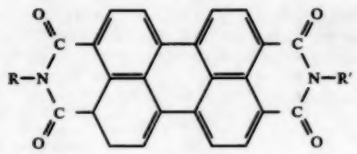
1. An electrophotographic recording material comprising an electrically conductive base material and a photoconductive layer provided on said base material, said photoconductive layer comprising at least one layer containing an asymmetrically substituted perylene-3,4,9,10-tetracarboxylic acid imide as charge carrier-producing compound, a photoconductor as charge transport compound, and a binder, wherein said acid imide is a charge carrier-producing compound represented by one of the following formulas:



where

R denotes hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, aryl or aralkyl and

A denotes a radical selected from a phenylene, a napthylene and a more highly fused aromatic carbocyclic or heterocyclic radical, said radical being unsubstituted or substituted by a halogen, an alkyl group, a cyano group or a nitro group;



(II)

where

R and R' are different from each other and denote hydrogen or a group selected from alkyl, hydroxyalkyl, alkoxyalkyl, cycloalkyl, aryl, aralkyl and heteroaryl, said group being unsubstituted or substituted by a halogen, alkyl group, cyano group or nitro groups;

(III)

where

R denotes hydrogen or a group selected from alkyl, hydroxyalkyl, alkoxyalkyl, aryl and aralkyl, said group being unsubstituted or substituted by a halogen, an alkyl group, a cyano group or a nitro group.

4,714,667

OPTICAL INFORMATION RECORDING MEDIUM

Tsutomu Sato; Masaakira Umehara; Michiharu Abe; Hideaki Oba, and Yutaka Ueda, all of Yokohama, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

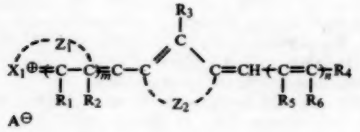
Filed Dec. 12, 1985, Ser. No. 808,413

Claims priority, application Japan, Dec. 18, 1984, 59-265247

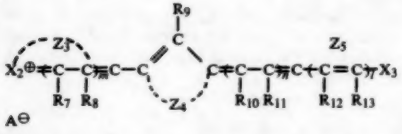
Int. Cl.[4] G03C 1/72

U.S. Cl. 430—270 9 Claims

1. An optical information recording medium comprising a substrate and a recording layer on said substrate, said recording layer comprising at least one compound having the formula (I) or (II):



(I)



(II)

wherein X_1, X_2 and X_3 represent O, S or Se; A^- represents an anion; l, m and n represent 0 or 1; R_4 represents a substituted or non-substituted aryl group or heterocyclic group; R_3 and R_9 represent hydrogen, alkyl, chloro or bromo, R_5, R_6, R_{10} and R_{11} represent hydrogen or an alkyl group; R_1, R_2, R_7, R_8, R_{12} and R_{13} represent hydrogen or a substituted or non-substituted alkyl, aryl or styryl group; Z_1, Z_3 and Z_5 represent atomic groups necessary for forming a substituted or non-substituted pyrylium, thiapyrylium, selenapyrylium, benzopyrylium, benzothiapyrylium, benzoselenapyrylium, naphthopyrylium, naphthothiapyrylium or naphthoselenapyrylium; Z_2 and Z_4 represent atomic groups necessary for forming a substituted or non-substituted five-membered carbocylic ring or six-membered carbocylic ring; and said five-membered ring and six-membered ring may be condensed with an aromatic ring said recording information medium being adapted to have information recorded thereon by irradiating said recording medium with laser light to cause an optical change in the form of spaced-apart pits in said recording layer and being adapted to regenerating such information by laser light

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4,714,668

METHOD FOR PATTERNING LAYER HAVING HIGH REFLECTANCE USING PHOTOSENSITIVE MATERIAL

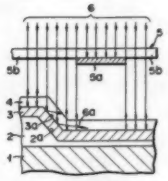
Tsunehisa Ueno, Tokyo; Yutaka Kamata, and Sinji Miyazaki, both of Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Division of Ser. No. 510,224, Jul. 1, 1983. This application Jun. 24, 1986, Ser. No. 878,004

Claims priority, application Japan, Jul. 5, 1982, 57-115449

Int. Cl.[4] G00F 7/26; G03C 1/84

U.S. Cl. 430—316 5 Claims



1. A method for patterning a layer having high reflectance, which is defined as 90% or greater, comprising the steps of:

providing a semi-conductor substrate for support of said layer, wherein said layer is conductive and includes an inclined surface portion;

directly forming on said layer a light-absorbing film having a ratio of transmitted light intensity to exposing incident light intensity of not more than 30%; said film covering the inclined surface portion of said layer, said film comprising at least one light absorbing material selected from a group consisting of silicon oxide and aluminum oxide, said silicon oxide and aluminum oxide having nonstoichiometric compositions, said light absorbing material being formed by plasma CVD, photo-CVD or ion plating;

forming a photosensitive material film on said light-absorbing film;

irradiating a selected region of said photosensitive material film with the exposing incident light;

developing said photosensitive material film to form a first pattern;

selectively etching said light-absorbing film using said first pattern as a mask so as to form a second pattern; and

selectively etching said layer having the high reflectance using said second pattern as a mask.

4,714,669

RADIATION-SENSITIVE POLYCONDENSATES, THEIR PREPARATION, MATERIAL COATED THEREWITH AND THE USE THEREOF

Josef Pfeifer, Therwil, and Rudolf Duthaler, Zürich, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 27, 1986, Ser. No. 845,084

Claims priority, application Switzerland, Apr. 11, 1985, 1552/85

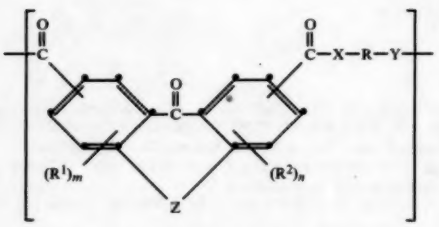
Int. Cl.[4] **G03C** *5/00;* **B05D** *3/06*

U.S. Cl. 430—325 **40 Claims**

1. A process for the production of a photographic or relief image which comprises

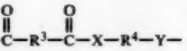
irradiating through a photomask with high-energy radiation a coating or film of a

radiation-sensitive linear saturated homo- or polycondensate selected from the group consisting of polyesters, polyamides an. polyester amides and containing at least one recurring structual unit of formula I



(I)

and, in the case of a copolycondensate, also recurring structural units of formula II



(II)

wherein

m and n are each independently of the other an integer from 0 to 3,

X and Y are each independently of the other —S—, —O— or —NR^5—,

Z is a direct bond, —CH_2—, —O—, —S—, —SO—, —SO_2—, —CO—, —NR^6— or —CR^6R^7, where R^6 is a hydrogen atom, C_1–C_{10}alkyl, phenyl, naphthyl or phenyl(C_aH_{2a}), where a is 2 to 4, and R^7 has the same meaning as R^6 but is not a hydrogen atom,

R^1 and R^2 are each independently of the other C_1–C_{10}alkyl, halogen, —CN, —NO_2, C_1–C_{12}alkoxy, phenoxy, naphthoxy or phenyl(C_aH_{2a}), wherein a is 1 to 4,

R is an unsubstituted or substituted divalent aliphatic, cycloaliphatic, araliphatic or aromatic radical, and, if X and Y are the —NR^5— group, R and one of R^5, when taken together, are C_5–C_7alkylene to which the second —NR^5— group is attached, or R is methylene, ethylene or propylene, and both radicals R^5 of the —NR_5— group, when taken together, are ethylene or propylene or, if one of X or Y is —S— or —O— and the other is —NR^5—, R and R^5 together are C_5–C_7 alkylene,

R^4 has independently the same meaning as R,

R^3 is a divalent saturated aliphatic or aromatic radical, and

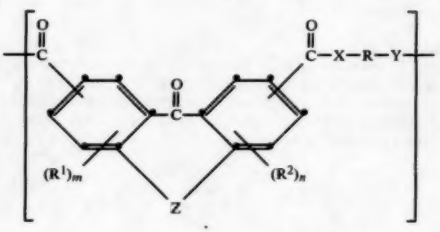
R^5 is a hydrogen atom, alkyl, cycloalkyl, aryl, aralkyl or alkaralkyl,

said copolycondensate containing at least 10 mol.% of the structural units of formula I, based on the copolycondensate, to crosslink the exposed, irradiated material, and

subsequently treating with a solvent to remove the uncrosslinked material from the unexposed areas to form a photographic or relief image.

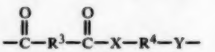
21. A process for the production of a protective layer which comprises

irradiating with high-energy radiation a coating or film of a radiation-sensitive linear saturated homo- or polycondensate selected from the group consisting of polyesters, polyamides and polyester amides and containing at least one recurring structual unit of formula I



(I)

and, in the case of a copolycondensate, also recurring structural units of formula II



(II)

wherein

m and n are each independently of the other an integer from 0 to 3,

X and Y are each independently of the other —S—, —O— or —NR^5—,

Z is a direct bond, —CH_2—, —O—, —S—, —SO—, —SO_2—, —CO—, —NR^6— or —CR^6R^7, where R^6 is a hydrogen atom, C_1–C_{10}alkyl, phenyl, naphthyl or phenyl(C_aH_{2a}), where a is 2 to 4, and R^7 has the same meaning as R^6 but is not a hydrogen atom,

R^1 and R^2 are each independently of the other C_1–C_{10}alkyl, halogen, —CN, —NO_2, C_1–C_{12}alkoxy, phenoxy, naphthoxy or phenyl(C_aH_{2a}), wherein a is 1 to 4,

R is an unsubstituted or substituted divalent aliphatic, cycloaliphatic, araliphatic or aromatic radical, and, if X and Y are the —NR^5— group, R and one of R^5, when taken together, are C_5–C_7alkylene to which the second —NR^5— group is attached, or R is methylene, ethylene or propylene, and both radicals R^5 of the —NR_5— group, when taken together, are ethylene or propylene or, if one of X or Y is —S— or —O— and the other is —NR^5—, R and R^5 together are C_5–C_7 alkylene,

R^4 has independently the same meaning as R,

R^3 is a divalent saturated aliphatic or aromatic radical, and

R^5 is a hydrogen atom, alkyl, cycloalkyl, aryl, aralkyl or alkaralkyl,

said copolycondensate containing at least 10 mol.% of the structural units of formula I, based on the copolycondensate, to crosslink the exposed, irradiated material to form the protective layer.

4,714,670

DEVELOPER INCLUDING AN ALIPHATIC CYCLIC CARBONATE IN THE OIL PHASE EMULSION

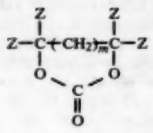
Luigi Amariti, Voorhees, and Llandro C. Santos, Cherry Hill, both of N.J., assignors to Imperial Metal & Chemical Company, Philadelphia, Pa.

Filed Jun. 9, 1986, Ser. No. 871,833

Int. Cl.[4] **G03C** *5/00*

U.S. Cl. 430—331 **13 Claims**

1. An emulsion developer for diazo-sensitized printing plates comprising, an oil phase consisting essentially of a partially water-soluble aliphatic cyclic carbonate having the formula:



where n is an integar from 0–2, and Z is selected from hydrogen, C_1–C_3 alkyl, hydroxyl alkyl or chloroalkyl, chlorine, hydroxy or phenyl, said carbonate having dissolved therein a resinous material which adheres to the imaged areas of said printing place, surfactant to keep any pigment dispersed in said oil phase and to maintain said oil phase in emulsion, and an aqueous phase containing water having dispersed therein a protective colloid, finely divided particles, and surfactant to keep these materials in suspension in the emulsion and to prevent the emulsified oil phase from coalescing in the aqueous phase of the emulsion, said carbonate being present in an amount in excess of that needed to saturate the aqueous phase of said emulsion and sufficient to maintain said resinous material in solution in the oil phase of said emulsion.

4,714,671

COLOR PHOTOGRAPHIC RECORDING MATERIAL CONTAINING A POLYMERIC GELATINE PLASTICIZER

Günter Helling, Odenthal, and Wolfgang Himmelmann, Leverkusen, both of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 25, 1986, Ser. No. 855,701

Claims priority, application Fed. Rep. of Germany, May 8, 1985, 3516466

Int. Cl.⁴ G03C *1/31, 1/04, 7/26*

U.S. Cl. 430—545 **7 Claims**

1. Colour photographic recording material comprising at least one light-sensitive silver halide emulsion layer and at least one light-sensitive or non-light-sensitive gelatine-containing binder layer containing a dispersion of a photographic auxiliary substance, an oil former and a gelatine plasticizer wherein the gelatine plasticizer is a polymer latex in which the dispersed particles consist to an extent of from 80 to 95% by weight of a scft core wherein the polymer has a glass transition temperature T_g below −10° C. and from 5 to 20% by weight of a hard shell wherein the polymer has a glass transition temperature T_g above 36° C.

7. Recording material according to claim 1, characterised in that the photographic auxiliary substance is a coupler, in particular a colour coupler.

4,714,672

IMMUNOASSAYS INVOLVING COMPLEMENT LYSING OF CHROMOPHORE CONTAINING MICROCAPSULES

Kyuji Rokugawa, and Yasuko Tamayama, both of Ootawara, Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Jun. 8, 1984, Ser. No. 618,936

Claims priority, application Japan, Jun. 14, 1983, 58-106345

Int. Cl.⁴ G01N *33/53, 33/555*

U.S. Cl. 435—7 **6 Claims**

1. An immunoassay method for quantitatively determining the amount of antigen or antibody in a sample comprising the steps of:

(a) mixing (1) a sample containing antigen or antibody to be quantitatively determined with (2) microcapsules containing an optically determinable substance, said microcapsules having surfaces on which are bound an antibody or an antigen specific to said antigen or antibody to be quantified and (3) a complement which is capable of lysing said microcapsules to form a reaction mixture in which occurs an immune reaction between said antibody or antigen on said surfaces of said microcapsules and said antigen or antibody in said sample, said immune reaction causing said complement to lyse said microcapsules thereby releasing said optically determinable substance from said microcapsules into said reaction mixture;

(b) detecting the absorbance of said reaction mixture during said immune reaction by optical measurements simultaneously at two different wavelengths; and

(c) quantifying the amount of said antigen or antibody in said sample by calculating the differences of said absorbances at said different wavelengths.

4,714,673

METHOD FOR MEASUREMENT OF CONCENTRATION OF SUBSTANCE

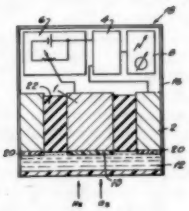
Manfred Kessler, An der Hornwiesen 50, and Jens Höper, Moorbachweg 28, both of D-8520 Erlangen, Fed. Rep. of Germany

Filed Sep. 10, 1984, Ser. No. 648,883

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1983, 3332745

Int. Cl.⁴ C12Q *1/54*

U.S. Cl. 435—14 **23 Claims**



1. A method for determining the concentration of H_2O_2 by the steps of: providing a metal measuring electrode, a reference electrode, a proton impermeable lipophilious base membrane containing both a carrier and ions selected form the group consisting of lipophilious ions, carrier bound ions, and both lipophilious and carrier bound ions, and an electrolyte chamber containing an electrolyte; and locating said electrodes adjacent said chamber wherein said base membrane seals said measuring electrode from direct contact with said electrolyte; providing a polorization voltage across said electrodes; providing circuit indicating means operationaly connected to said electrodes; providing H_2O_2 in said electrolyte; and determining H_2O_2 concentration from said indicating means.

4,714,674

CHEMOTACTIC ASSAY FOR IMMUNOGENICITY

Michael A. Palladino, San Mateo, Calif., assignor to Genentech, Inc., San Francisco, Calif.

Filed Feb. 28, 1985, Ser. No. 707,005

Int. Cl.⁴ A61K *39/00;* **C12Q** *1/02, 1/34;* **G01N** *33/531*

U.S. Cl. 435—18 **25 Claims**

1. A method for determining the likelihood that a composition containing a protein made in recombinant culture will be immunogenic in recipients, comprising contacting leukocytes with the composition, and observing for chemotactic effect of the composition.

4,714,675

STABILIZED SENSITIVITY TEST DISK

Yoshinobu Miyashita, Osaka; Tadashi Hamanaka, Kobe, and Kenzi Iwata, Osaka, all of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 16, 1983, Ser. No. 504,956

Claims priority, application Japan, Apr. 13, 1982, 57-61336

Int. Cl.⁴ C12Q *1/18, 1/34*

U.S. Cl. 435—32 **8 Claims**

1. In a sensitivity test disk used for determining the sensitiv-

ity of microorganisms to antibacterial agents, said sensitivity test disk being obtained by impregnating a disk carrier with an aqueous solution of antibacterial agent and drying said disk carrier, the improvement wherein a stabilizer consisting essentially of a water-soluble polymer in a concentration of 0.1 to 1.0% by weight of the aqueous solution, having film-forming properties is dissolved in the aqueous solution of antibacterial agent, said polymer, upon drying of the impregnated disk carrier to give a sensitivity test disk, forms a film of which covers the antibacterial agent to protect it from atmospheric moisture.

4,714,676

PROTEIN MODIFICATION TO PROVIDE ENZYME ACTIVITY

Melvin H. Keyes, Sylvania, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio

Continuation of Ser. No. 419,116, Sep. 16, 1982, abandoned. This application Mar. 21, 1983, Ser. No. 476,955

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.[4] **C12N** *11/14, 11/02, 9/00, 9/14*

U.S. Cl. 435—176 **49 Claims**

1. A process for chemically altering the substrate specifity of a native protein to produce an immobilized enzyme-like modified protein comprising:

a. selecting an enzyme to be modeled;

b. partially denaturing a native protein in the presence of an inhibitor for said model enzyme to form a partially denatured native protein model enzyme inhibitor complex;

c. contacting said partially denatured protein-model enzyme inhibitor complex with a solid support for a time sufficient and at a temperature sufficient to absorb and immobilize said partially denatured protein-model enzyme inhibitor complex on said solid support and

d. cross-linking said absorbed, immmobilized protein-model enzyme inhibitor complex to form an immobilized enzyme-like modified protein.

4,714,677

PROTEIN MODIFICATION TO PROVIDE ENZYME ACTIVITY

Melvin H. Keyes, Sylvania, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio

Continuation of Ser. No. 418,884, Sep. 16, 1982, abandoned. This application Mar. 21, 1983, Ser. No. 477,553

Int. Cl.[4] **C12N** *9/00, 11/10, 9/14*

U.S. Cl. 435—183 **30 Claims**

1. A process for chemically altering the substrate specificity of a native protein to produce a predetermined modified enzyme-like protein comprising:

a. selecting an enzymatically active protein to be modeled;

b. immobilizing an inhibitor of said predetermined enzyme model on a solid support:

c. partially denaturing said native protein and

d. cross-linking said partially denatured native protein in the presence of said support immobilized inhibitor of said model enzyme.

4,714,678

TEMPERATURE SENSITIVE STRAIN OF BOVINE VIRAL DIARRHOEA VIRUS

Jean-Claude Delgoffe, Bierges; Michèle Lobmann, Rosieres, and Nathan Zygraich, Brussels, all of Belgium, assignors to Smith-Kline-RIT, Belgium

Division of Ser. No. 434,155, Oct. 13, 1982, Pat. No. 4,618,493. This application Jul. 31, 1986, Ser. No. 871,732

Int. Cl.[4] **C12N** *7/00, 7/06;* **A61K** *39/12*

U.S. Cl. 435—235 **1 Claim**

1. An isolated and purified temperature sensitive strain of bovine viral diarrhoea virus having the temperature sensitive growth characteristics of the C.N.C.M. I-199 virus strain.

4,714,679

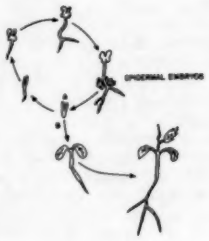
IN VITRO PROPAGATION OF GRAPE

William R. Krul, Narragansett, R.I., assignor to The Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, Providence, R.I.

Continuation of Ser. No. 446,442, Dec. 3, 1982. This application Jun. 27, 1985, Ser. No. 749,306

Int. Cl.[4] **A01G** *1/00*

U.S. Cl. 435—240.48 **1 Claim**



1. A method for controlling the growth of plant embryos for either self-replicative or vine development modes, which includes:

(a) initiating somatic embryogenesis by placing callus cultures in a medium conducive for self-replication of embryos for a first period of time during which the embryos germinate and are characterized by late torpedo stage embryos prior to root and shoot elongation;

(b) culturing for vine development at least some of the embryos of step (a) in a medium having cytokinin activity for a second period of time at the end of which time the embryos are characterized by green divided cotyledons;

(c) transferring the embryos of step (b) to a medium free of cytokinin activity until such time that they develop sufficiently for transfer to a non-agar growth support medium.

4,714,680

HUMAN STEM CELLS

Curt I. Civin, Baltimore, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Feb. 6, 1984, Ser. No. 670,740

Int. Cl.[4] **C12N** *5/02;* **G01N** *33/577*

U.S. Cl. 435—240.25 **5 Claims**

1. A suspension of human cells comprising pluripotent lympho-hematopoietic stem cells substantially free of mature lymphoid and myeloid cells.

4,714,681

QUADROMA CELLS AND TRIOMA CELLS AND METHODS FOR THE PRODUCTION OF SAME

Christopher L. Reading, Kingwood, Tex., assignor to The Board of Reagents, The University of Texas System Cancer Center, Austin, Tex.

Continuation of Ser. No. 279,248, Jul. 1, 1981, Pat. No. 4,474,893. This application Jun. 18, 1984, Ser. No. 621,394

The portion of the term of this patent subsequent to Oct. 2, 2001, has been disclaimed.

Int. Cl.[4] **C12N** *5/00, 15/00;* **C07K** *15/04*

U.S. Cl. 435—240.27 **56 Claims**

1. A quadroma cell, wherein said quadroma cell is the fusion product of a first hybridoma cell which produces an antibody having specific binding affinity to a first desired antigen and a second hybridoma cell which produces an antibody having specific binding affinity for a second desired antigen, and wherein said quadroma cell produces a recombinant monoclonal antibody having specific binding affinity for both said first and said second desired antigens.

15. A trioma cell, wherein said trioma cell is the fusion

product of a hybridoma cell which produces an antibody having specific binding affinity to a first desired antigen and a lymphocyte which produces an antibody having specific binding affinity to a second desired antigen, and wherein said trioma cell produces a recombinant monoclonal antibody having specific binding affinity for both said first and said second desired antigens.

4,714,682

FLUORESCENT CALIBRATION MICROBEADS SIMULATING STAINED CELLS

Abraham Schwartz, Durham, N.C., assignor to Flow Cytometry Standards Corporation, Research Triangle Park, N.C.

Division of Ser. No. 805,654, Dec. 11, 1985, which is a continuation-in-part of Ser. No. 685,464, Dec. 24, 1984. This application Apr. 3, 1987, Ser. No. 33,625

Int. Cl.[4] G01N *31/00*

U.S. Cl. 436—10 **3 Claims**

SWELL SEED BEADS WITH OIL SOLUBLE COMPOUND
SWELL BEADS WITH MONOMER/INITIATOR HOMOGENATE AND POLYMERIZE
AMINATE THE SURFACE BY REACTING THE EPOXY GROUPS WITH A DIAMINE
FLUORESCINATE THE SURFACE OF THE MICROBEADS WITH A REACTIVE FLUORESCENT DYE

1. The method of making a calibration microbead standard to minimize aggregation and maximize yield comprising the steps:

(a) homogenizing a highly insoluble ($<10^{-3}$ g/l) compound of molecular weight <1000 in a surfactant solution to obtain a first homogenate;

(b) swelling small seed microbeads, 0.1–3u in diameter, with said first homogenate;

(c) homogenizing an aqueous surfactant solution containing a large stabilizing alkaline halide salt with a mixture of oil soluble polymerizable monomers within which is dissolved 0.5–5% by weight an oil soluble initiator to obtain a second homogenate;

(d) swelling the seed microbeads a second time with said second homogenate; and

(e) placing said twice swollen microbeads under conditions appropriate to cause said initiator to polymerize the monomers in the swollen microbeads.

4,714,683

POLYPEPTIDE TUMOR INHIBITORS AND ANTIBODIES THERETO

Mohammed Shoyab, Seattle; Hans Marquardt, Mercer Island, and George J. Todaro, Seattle, all of Wash., assignors to Oncogen, Seattle, Wash.

Filed Jan. 25, 1985, Ser. No. 694,712

Int. Cl.[4] G01N *33/53, 33/534, 33/577, 33/68*

U.S. Cl. 436—547 **18 Claims**

1. A method for retarding the growth of neoplastic cells which comprises:

applying to neoplastic cells a growth retarding amount of a polypeptide of at least about 15 amino acids having a sequence the same as a sequence of a neoplastic cell retarding polypeptide found in mammalian brain, with the proviso that there are not more than two amino acid changes and an insertion or deletion of not more than three amino acids.

4,714,684

METHOD OF FORMING SINGLE CRYSTAL LAYER ON DIELECTRIC LAYER BY CONTROLLED RAPID HEATING

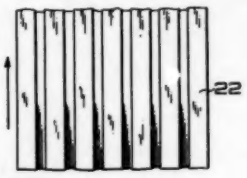
Kazuyuki Sugahara; Tadashi Nishimura; Shigeru Kusunoki, and Yasuo Inoue, all of Hyogo, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 26, 1986, Ser. No. 844,324

Claims priority, application Japan, Jan. 9, 1986, 61-001465

Int. Cl.[4] H01L *21/263;* **C30B** *13/06*

U.S. Cl. 437—19 **7 Claims**



1. A method of manufacturing a semiconductor device comprising:

forming a first dielectric layer on a semiconductor substrate,

forming an amorphous or polycrystalline semiconductor layer on said first dielectric layer,

forming a second dielectric layer of substantially uniform thickness on said semiconductor layer,

forming a third dielectric layer on said second dielectric layer, said third dielectric layer being flat on its lower surface but having a plurality of parallel grooves in its upper surface to form regions at the bottom of said grooves having a lesser thickness than the thickness of the remaining regions thereof, and

melting and recrystallizing said semiconductor layer by the irradiation of laser beams thereby converting said semiconductor layer into single crystals.

4,714,685

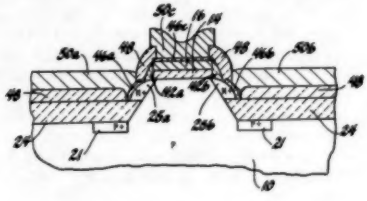
METHOD OF FABRICATING SELF-ALIGNED SILICON-ON-INSULATOR LIKE DEVICES

Peter J. Schubert, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 8, 1986, Ser. No. 939,183

Int. Cl.[4] H01L *21/365, 41/425*

U.S. Cl. 437—41 **6 Claims**



1. A process for forming an MOS transistor which has relatively low parasitic capacitances comprising the steps of:

forming on a semiconductor body a mesa which includes a first layer for use as a gate region of the transistor and a first insulator layer, a portion of which dielectrically isolates the mesa from the supporting semiconductor body, such portion being suitable for use as a gate insulator of the transistor;

etching the semiconductor body for forming a platform having sloped sidewalls on the top of which is supported the mesa;

forming a second insulating layer extending over the exposed semiconductor body and partially up the sidewalls of the platform, leaving an upper portion of the sidewalls of the platform exposed;

growing semiconductor regions laterally out from such exposed portion of the sidewalls for forming a pair of opposed semiconductor regions adaptable for use as the source and drain of the transistor; and

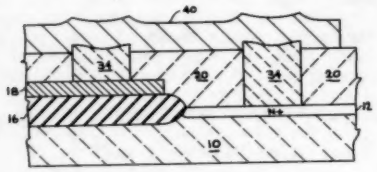
doping such regions using the mesa as a mask for adapting them to serve as self-aligned source and drain regions of the transistor.

4,714,686

METHOD OF FORMING CONTACT PLUGS FOR PLANARIZED INTEGRATED CIRCUITS

Craig S. Sander, Cupertino, and Balaji Swaminathan, Mountain View, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jul. 31, 1985, Ser. No. 761,206
Int. Cl.[4] H01L *21/283, 21/308*
U.S. Cl. 437—195 **6 Claims**



1. An improved method for forming conductive plugs in contact windows in a dielectric layer overlying junction regions in an integrated circuit structure comprising:

(a) forming contact windows in said dielectric layer in a pattern conforming to said junction regions;

(b) forming a layer of polysilicon on said dielectric layer to fill said contact windows;

(c) performing an etching process which etches said polysilicon filler material and said dielectric layer at approximately the same rate, such that all said filler material is removed from the surface of said dielectric layer, leaving said filler material only in said windows such that the perimeter surface of said window filler material extends above or below the surface of said dielectric layer by approximately no more than 0.3 microns;

(d) forming a first masking layer over said plugs in windows overlying junction regions having a first conductivity type;

(e) doping, with a second conductivity type dopant, the plugs in windows overlying junction regions having said second conductivity type;

(f) removing said first masking layer;

(g) forming a second masking layer over said plugs doped with said second conductivity type dopant;

(h) doping, with a first conductivity type dopant, the plugs in windows overlying junction regions having said first conductivity type; and

(i) removing said second masking layer; whereby each window has a plug therein having a conductivity type matching the underlying junction region.

4,714,687

GLASS-CERAMICS SUITABLE FOR DIELECTRIC SUBSTRATES

Louis M. Holleran, Elmira, and Francis W. Martin, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Oct. 27, 1986, Ser. No. 923,432
Int. Cl.[4] C03C *10/04, 10/08, 3/085, 3/062*
U.S. Cl. 501—9 **9 Claims**

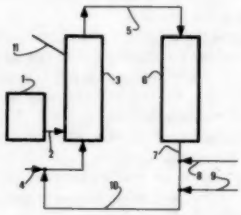
1. A glass-ceramic body exhibiting a dielectric constant less than 6 and containing willemite as the predominant crystal phase and cordierite as a secondary crystal phase, said body having a composition essentially free from Li_2O, Na_2O, and K_2O and consisting essentially, expressed in terms of weight percent on the oxide basis, of 15–45% ZnO, 3–15% MgO, 10–30% Al_2O_3, and 30–55% SiO_2.

4,714,688

PROCESS FOR REGENERATING USED CATALYSTS BY MEANS OF HYDROGEN PEROXIDE AQUEOUS SOLUTION STABILIZED WITH AN ORGANIC COMPOUND

Chan Trinh Dinh, Le Vesinet; Alain Desvard, Elancourt, and Germain Martino, Poissy, all of France, assignors to Institut Francais du Petrole, Rueil-Malamison, France

Filed Mar. 7, 1986, Ser. No. 836,866
Claims priority, application France, Mar. 8, 1985, 85 03409
Int. Cl.[4] B01J *23/94, 23/92, 38/52, 38/62*
U.S. Cl. 502—33 **13 Claims**



1. A process for regenerating an at least partially deactivated sulfur-containing catalyst after its use for the hydro-treatment of a hydrocarbon charge containing at least one vanadium, nickel or iron metal, said deactivation resulting from the deposit of at least one of said metals onto the catalyst, said catalyst initially comprising an inorganic carrier and at least one active metal or compound of an active metal from group VIB and/or VIII, said process consisting essentially of the following successive steps:

(a) The sulfur-containing deactivated catalyst is roasted in the presence of an oxygen-containing gas at 300°–600° C. so as to remove at least 90% of the sulfur,

(b) the catalyst obtained in step (a) is contacted with a hydrogen peroxide aqueous solution containing a stabilizing amount of at least one organic compound selected from the group consisting of an alcohol and mixtures of alcohols, so as to remove at least 10% of the deposited vanadium, nickel or iron metals, and

(c) the regenerated catalyst is separated from the hydrogen peroxide aqueous solution.

4,714,689

PROCESS FOR THE REGENERATION OF CATALYSTS FOR THE GAS-PHASE REDUCTION OF AROMATIC NITRO COMPOUNDS

Günter Stammann, Cologne; Zoltan Kricsfalussy; Helmut Waldmann, both of Leverkusen; Joachim Schneider, and Harald Medem, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 7, 1986, Ser. No. 894,581

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530820

Int. Cl.[4] B01J *23/96, 23/94, 38/16;* C07C *45/11*

U.S. Cl. 502—54 16 Claims

1. A process for the regeneration of a catalyst for the gas-phase reduction of aromatic nitro compounds to aromatic amines comprising treating the catalyst in a catalyst zone at a temperature of 200° C. to 600° C., wherein the catalyst contains a metal selected from the group consisting of copper, iron, nickel, palladium, platinum and mixtures thereof, said metal being in metallic form or in the form of compounds, with a gas mixture which contains (a) oxygen and (b) a nitrogen compound selected from the group consisting of inorganic amines, organic amines and nitrogen oxides, said regeneration being conducted until no temperature change is observed in the catalyst zone, or until no CO_2 is detectable in gas exiting said zone and at a pressure of 0.1 to 30 bars, wherein the oxygen is fed at a rate of 5 to 100 l/h and the nitrogen compound is fed at a rate of 2 to 1,000 g/h per liter of bulk volume of the catalyst.

2. A process according to claim 1 wherein the gas mixture further comprises steam.

10. A process according to claim 1, wherein the nitrogen compound is selected from the group consisting of ammonia, hydrazines, hydroxylamines, organic amines having 1 to 6C atoms and 1 to 3N atoms, NO, NO_2, N_2O, N_2O_2, N_2O_3, N_2O_4, N_2O_5 and mixtures thereof.

4,714,690

SILICATE-BOUND ZEOLITE GRANULATES, PROCESS FOR THEIR PRODUCTION AND USE

Hans Strack, Alzenau, and Peter Kleinschmit, Hanau, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 597,281, Apr. 6, 1984, abandoned. This application Oct. 24, 1985, Ser. No. 791,032

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1983, 3312876

Int. Cl.[4] B01J *29/06*

U.S. Cl. 502—64 28 Claims

1. Silicate-bound zeolite granulates, comprising zeolite dispersed in an alkali silicate binder, the binder having an alkali metal cation, the zeolite having a first metal cation which is essentially absent from the composition of the binder, and wherein the zeolite also additionally contains a second metal cation which second cation is present in the binder.

2. The silicate-bound zeolite granulates of claim 1 further comprising the original cation in the binder having been essentially completely exchanged by a different cation.

3. The silicate-bound zeolite granulates of claim 2 further comprising the binder is sodium silicate wherein the sodium ions are essentially completely exchanged by a different cation.

4. The silicate-bound zeolite granulates of claim 3 further comprising the binder is sodium silicate wherein the sodium ions are essentially completely exchanged by a member selected from magnesium, calcium, barium, aluminum, and the rare earths.

4,714,691

HETEROGENEOUS CATALYST PROCESS

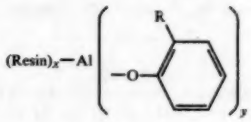
Dixie E. Goins, Baton Rouge, La.; Silas W. Holmes, Columbia, and Edward A. Burt, Orangeburg, both of S.C., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 748,733, Jun. 25, 1985, Pat. No. 4,631,349. This application Aug. 25, 1986, Ser. No. 900,304

Int. Cl.[4] B01J *31/06*

U.S. Cl. 502—152 14 Claims

1. A resin-bonded aluminum phenoxide catalyst containing the structure



wherein R is tert-alkyl, x is 1 or 2, y is 1 or 2 and $x+y=3$ and the Resin is the residue of a solid polymeric resin.

4,714,692

MICROEMULSION IMPREGNATED CATALYST COMPOSITE AND USE THEREOF IN A SYNTHESIS GAS CONVERSION PROCESS

Hayim Abrevaya, Chicago, and William M. Targos, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Apr. 3, 1986, Ser. No. 847,981

Int. Cl.[4] B01J *23/46, 37/02*

U.S. Cl. 502—261 6 Claims

1. A method for depositing a metal component on a refractory inorganic oxide support carrier whereby said metal component is substantially present as metal particles which are less than about 200 A and do not vary more than 20 A in size which method comprises:

(a) contacting a metal-containing water in hydrocarbon microemulsion liquid impregnant medium comprising aqueous cores containing ions of dissolved unreduced metal therein with said inorganic oxide support carrier under conditions sufficient to fixate said metal-containing aqueous cores to said support;

(b) separating said support from said impregnant medium; and,

(c) immobilizing said unreduced metal contained in said aqueous cores by calcining said support in a fluidized bed at temperature conditions sufficient to effect removal of organics from the support but insufficient to effect metal agglomeration on the support and then reducing the calcined support at temperature conditions sufficient to effect metal reduction, but insufficient to effect metal agglomeration on the support.

3. The method of claim 1 characterized in that said metal component comprises ruthenium.

5. The method of claim 1 further characterized in that said metals are dissolved in said water core at a concentration greater than 0.1 moles per liter.

4,714,693

METHOD OF MAKING A CATALYST COMPOSITION COMPRISING UNIFORM SIZE METAL COMPONENTS ON CARRIER

William M. Targos, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 3, 1986, Ser. No. 847,982

Int. Cl.[4] B01J *21/04, 21/08, 21/12, 23/40*

U.S. Cl. 502—261 14 Claims

1. A method of producing a catalyst, which catalyst comprises about 0.1 to about 20 wt. % of an active metal component of an inorganic oxide support material, which comprises the sequential steps of:

(a) contacting the support material with an impregnant solution containing water core microemulsions suspended in a liquid medium, with a metal component being present in the microemulsions as a dissolved metal ion in a nonreduced state at a concetration above 0.1 moles per liter;
(b) separating the support material and the impregnant solution;
(c) drying the impregnated support material, and then
(d) reducing said metal component present on the support material, with the size distribution of the metal component deposited by steps (a)–(d) being such that at least 90 wt. % of said metal component is present as metal particles which do not vary more than 20 Å in size.

4,714,694

ALUMINUM-STABILIZED CERIA CATALYST COMPOSITIONS, AND METHODS OF MAKING THE SAME

Chung-Zong Wan, Somerset, and Joseph C. Dettling, Howell, both of N.J., assignors to Engelhard Corporation, Menlo Park, N.J.

Filed Jun. 30, 1986, Ser. No. 880,270
Int. Cl.[4] B01J *23/10, 23/56*
U.S. Cl. 502—304 **52 Claims**

15. A method of making a catalyst composition comprising a mixture of an activated alumina and an aluminum-stabilized ceria and one or more platinum group metal catalytic components, the method comprising:
(a) dispersing one or more platinum group metal catalytic components on an activated alumina;
(b) impregnating bulk ceria or a bulk ceria precursor with a liquid dispersion of an aluminum-stabilizer precursor and calcining the impregnated ceria to provide an aluminum-stabilized ceria;
(c) dispersing one or more non-rhodium platinum group metal components on the aluminum-stabilized ceria; and
(d) combining the ceria from step (b) with the activated alumina to form an alumina-ceria mixture.

4,714,695

METHOD FOR THE PREPARATION OF HIGH ACTIVITY PALLADIUM BASED CATALYSTS

Christos Paparizos, Willowick; Wilfrid G. Shaw, Lyndhurst, and James L. Callahan, Wooster, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 724,535, Apr. 18, 1985, Pat. No. 4,623,635. This application Apr. 16, 1986, Ser. No. 852,733
Int. Cl.[4] B01J *23/42, 31/00, 27/24, 27/057*
U.S. Cl. 502—339 **6 Claims**

1. A palladium metal based catalyst having the formula

$$PdTe_aZn_dE_e$$

where
E is one or more metals selected from the group consisting of groups IIA, IIIA, IVA, VA, IB, VIIB or VIII;
a, d and e are from about 0 to 3 with the proviso that at least d or e≠0, and
Te, Zn and E are promoter elements,
prepared by the steps of:
forming an aqueous solution of a palladium compound;
adding to said solution a powder of a reducing metal selected from the group consisting of Zn and said E group promoter metals, said metal being more electropositive than palladium, in an amount sufficient to reduce all of the palladium in said palladium compound to palladium metal;
reducing the palladium to its metallic state on the surface of said reducing metal; and
separating the resulting catalyst from said solution.

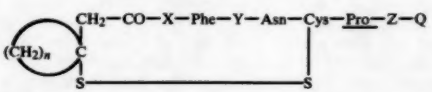
4,714,696

NOVEL DERIVATIVES OF ARGININE VASOPRESSIN ANTAGONISTS

Maurice Manning, Toledo, Ohio, and Wilbur H. Sawyer, Scarsdale, N.Y., assignors to Medical College of Ohio, Toledo, Ohio and Trustees of Columbia University, New York, N.Y., a part interest

Filed Jan. 26, 1984, Ser. No. 574,257
Int. Cl.[4] A61K *37/34;* **C07K** *7/16*
U.S. Cl. 514—11 **28 Claims**

1. A compound of the formula



wherein n is 4 or 5; X is (D- or L-)Tyr(R), D-Phe, D-Val, D-Leu, D-Ile, D-Nva, D-Nle, D-Cha, D-Abu, D-Thr, D-Asn, D-Gln or D-Met; Y is Val, Ile, Thr, Ala, Lys, Cha, Nva, Met, Nle, Orn, Ser, Asn, Gln, Phe, Tyr, Gly, Abu or Leu; Z is (D- or L-)Arg, Orn or Lys; Q is Arg(NH_2), Ser(NH_2), (D- or L-)Ala(NH_2), Gly, OH or NH_2 and R is methyl, ethyl, propyl or butyl, provided that when Y is Val or Gln, R is also H.

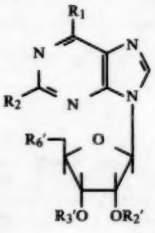
4,714,697

N^6-BICYCLOADENOSINES AND METHODS OF USE

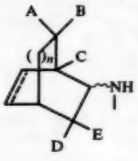
Bharat Trivedi, Canton, Mich., assignor to Warner Lambert Company, Morrisplains, N.J.

Filed Sep. 9, 1985, Ser. No. 772,983
Int. Cl.[4] A61K *31/70;* **C07H** *19/167*
U.S. Cl. 514—46 **14 Claims**

1. A compound of the formula

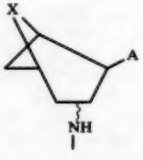


wherein R_1 is of formula



IIA

or



IIB

in which NH— is either endo or exo; is a double or single bond; n is zero, one, or two; A and B are either both

hydrogen or both methyl; D and E are also either both hydrogen or both methyl; C is hydrogen or methyl; and the proviso that when D and E are methyl then A and B are both hydrogen and C is methyl but when D and E are hydrogen then A, B, and C are all hydrogen or all methyl; X is $-C(CH_3)_2-$, $-CH_2-$, $-CH_2CH_2-$, or $-CH=CH$; R_2 is hydrogen, halogen, SR where R is hydrogen or lower alkyl, NR^iR^{ii} where R^i and R^{ii} are independently hydrogen, lower alkyl, phenyl or phenyl substituted by lower alkyl, lower alkoxy, halogen, or trifluoromethyl; R_2' and R_3' are independently hydrogen, lower alkanoyl, benzoyl, or benzoyl substituted by lower alkyl, lower alkoxy, halogen, or trifluoromethyl, or when taken together, R_2' and R_3' may be lower alkylidene; R_6' is halogen, hydrogen or R_5O where R_5' is hydrogen, lower alkanoyl, benzoyl, or benzoyl substituted by lower alkyl, lower alkoxy, halogen, or trifluoromethyl; and the $\sim$NH— is attached to either one or the other of the adjacent carbons; its individual diastereomers or mixtures thereof, or a pharmaceutically acceptable acid addition salt thereof.

12. a pharmaceutical composition for treating pain or inflammation comprising an analgesic or antiinflammatory effective amount of a compound as claimed in claim **1** together with a pharmaceutically accepted carrier.

4,714,698

8-ALKYLTHIO-2-PIPERAZINO-PYRIMIDO[5,4-D]-PYRIMIDINES

Josef Roch; Armin Heckel; Josef Nickl; Erich Muller; Berthold Narr, all of Biberach; Rainer Zimmermann, Mittelbiberach, and Johannes Weisenberger, Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Riss, Fed. Rep. of Germany

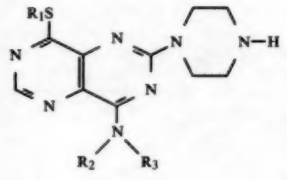
Filed Jun. 17, 1985, Ser. No. 745,095

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1984, 3423092

Int. Cl.[4] A61K *31/505;* **C07D** *471/04*

U.S. Cl. 514—212 **5 Claims**

1. An 8-alkylthio-2-piperazino-pyrimido[5,4-d]pyrimidine of the formula:



(I)

wherein

R_1 is alkyl group having 1 to 3 carbon atoms;

R_2 is a hydrogen atom, an allyl group or an alkyl group having 1 to 4 carbon atoms;

R_3 is an alkyl group having 1 to 6 carbon atoms or an allyl, cyclohexyl, phenyl, benzyl, 2-hydroxyethyl, 2-hydroxy-n-propyl or 3-hydroxy-n-propyl group; or

R_2 and R_3 together with the nitrogen atom between them form a pyrrolidino, piperidino, hexamethyleneimino or heptamethyleneimino group;

or a physiologically acceptable acid addition salt thereof.

4. In accordance with claim **1**, 8-methylthio-2-piperazino-4-pyrrolidino-pyrimido[5,4-d]pyrimidine or a physiologically acceptable acid addition salt thereof.

4,714,699

2-TOLYLMORPHOLINE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS

Louis Lafon, Paris, France, assignor to Societe Anonyme Dite: Laboratoire L. Lafon, Maisons Alfort, France

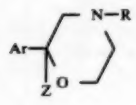
Continuation of Ser. No. 660,219, Oct. 12, 1984, abandoned. This application Mar. 18, 1987, Ser. No. 27,350

Claims priority, application France, Oct. 14, 1983, 83 16406

Int. Cl.[4] A61K *31/535;* **C07D** *295/02*

U.S. Cl. 514—227 **7 Claims**

1. A 2-tolylmorpholine derivative corresponding to the general formula



(I)

(in which Ar is a tolyl group, Z is H and R is a C_1–C_4 alkyl group), which is selected from the group of 2-tolyl-4-alkylmorpholines consisting of

(a) 2-p-tolyl-4-isopropylmorpholine and its addition salts,

(b) 2-m-tolyl-4-methylmorpholine and its addition salts,

(c) 2-p-tolyl-4-methylmorpholine and its addition salts,

(d) 2-o-tolyl-4-tert.-butylmorpholine and its addition salts,

(e) 2-p-tolyl-4-tert.-butylmorpholine and its addition salts.

7. A therapeutic composition which contains, in association with a physiologically acceptable excipient, at least one 2-tolyl-4-alkylmorpholine derivative selected from the group consisting of 2-p-tolyl-4-isopropylmorpholine, 2-m-tolyl-4-methylmorpholine, 2-p-tolyl-4-methylmorpholine, 2-o-tolyl-4-tert.-butylmorpholine, 2-p-tolyl-4-tert.-butylmorpholine and their addition salts.

4,714,700

N-SUBSTITUTED 2,4-DIALKOXY BENZENESULFONAMIDES AND PHARMACEUTICAL COMPOSITIONS

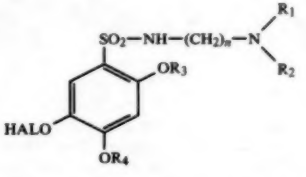
Jean-Paul Fournier, Versailles, and Patrick Choay, Paris, both of France, assignors to Choay S.A., Paris Cedex, France

Division of Ser. No. 370,168, Apr. 20, 1982, abandoned. This application Feb. 12, 1985, Ser. No. 700,478

Int. Cl.[4] A61K *31/435, 31/535;* **C07D** *295/12*

U.S. Cl. 514—229 **10 Claims**

1. A compound of the formula:



and the physiologically acceptable salts thereof, wherein

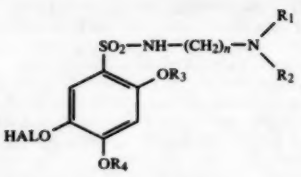
n is 2 or 3;

R_3 and R_4 are lower alkyl,

R_1 and R_2 together with the nitrogen to which they are attached, represent a heterocyclic group selected from the group consisting of pyrrolidino, morpholino or piperidino, and

wherein HALO is chloro or bromo.

6. A pharmaceutical composition which comprises a pharmaceutical carrier and a phenobarbital sleep potentiating effective amount of a compound of the formula:



and the physiologically acceptable salts thereof, wherein

n is 2 or 3;

R_3 and R_4 are lower alkyl;

R_1 and R_2 together with the nitrogen to which they are attached, represent a heterocyclic group selected from the group consisting of pyrrolidino, morpholino, or piperidino; and wherein

HALO is chloro or bromo.

4,714,701

ANTIVIRAL COMPOUNDS

Lilia M. Beauchamp, Raleigh, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

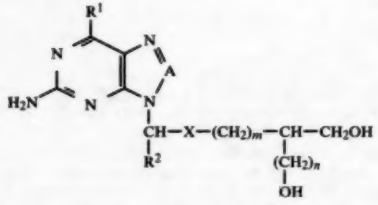
Filed May 2, 1986, Ser. No. 859,076

Claims priority, application United Kingdom, May 2, 1985, 8511222; May 2, 1985, 8511224

Int. Cl.[4] C07D *473/18*; A61K *31/52*

U.S. Cl. 514—258 **11 Claims**

1. A compound of formula (I)



(I)

wherein A is a N; R^1 is a hydrogen, cl, Br, hydroxy or amino, R^2 is hydrogen or C_{1-4} alkyl, X is oxygen or sulphur and m and n are each 0 or 1 provided that m+n=1; or a physiologically acceptable salt or ester thereof.

4,714,702

QUINAZOLINONE DERIVATIVE

Ichizo Inoue, Kawanishi; Toyonari Oine, Nara; Yoshihisa Yamada, Kyoto; Ryuichi Ishida, Suita, and Takashi Ochiai, Kobe, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Continuation of Ser. No. 564,006, Dec. 21, 1983, abandoned. This application Jul. 21, 1986, Ser. No. 888,631

Claims priority, application Japan, Jan. 13, 1983, 58-4707

Int. Cl.[4] A61K *31/505*; C07D *239/90*

U.S. Cl. 514—259 **2 Claims**

2. A pharmaceutical composition which comprises a pharmaceutically effective amount of 2-fluoromethyl-3-(2-methyl-4-chlorophenyl)-6-amino-4(3H)-quinazolinone or a pharmaceutically acceptable acid addition salt thereof and pharmaceutically acceptable carrier therefor.

4,714,703

METHOD OF INHIBITING HERPETIC LESIONS

Joseph H. Burckhalter, 2201 Melrose, Ann Arbor, Mich. 48104

Continuation of Ser. No. 774,902, Sep. 11, 1985, abandoned, which is a continuation of Ser. No. 672,148, Nov. 16, 1984, abandoned, which is a continuation of Ser. No. 485,997, Apr. 18, 1983, abandoned. This application Mar. 31, 1986, Ser. No. 846,841

Int. Cl.[4] A61K *31/505*

U.S. Cl. 514—274 **5 Claims**

1. A method of inhibiting surface lesions associated with human herpes simplex infection comprising:

administering to any such lesion an effective lesion-inhibiting amount of a pharmaceutical composition in topical dosage form containing as active component about 0.1 to about 5 percent by weight of 5-fluorouracil based on the total weight of the composition.

4,714,704

ALKOXY CYCLOALKANOL ESTERS OF DIHYDROLYSERGIC ACID USEFUL AS 5HT RECEPTOR ANTAGONISTS

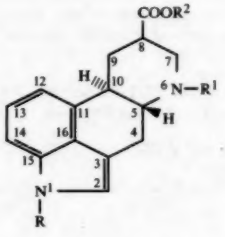
William L. Garbrecht; Gifford P. Marzoni, both of Indianapolis, and Kathleen R. Whitten, Zionsville, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 1, 1985, Ser. No. 782,340

Int. Cl.[4] A61K *31/48*; C07D *457/04*

U.S. Cl. 514—288 **4 Claims**

1. A method of blocking $5HT_2$ receptors which comprises administering to a mammal having an excess of serotonin centrally or peripherally an $5HT_2$ blocking dose of a compound of the formula



wherein R is primary or secondary C_{1-8} alkyl, CH_2—C_{2-4} alkenyl, C_{3-8} cycloalkyl or C_{3-6} cycloalkyl substituted C_{1-5} primary or secondary alkyl, the total number of carbon atoms in R not to exceed 8; R^1 is C_{1-4} straight chain alkyl; and R^2 *is* C_{1-3} alkyloxy C_{5-7} cycloalkyl; and pharmaceutically-acceptable salts thereof.

4,714,705

4-NITROGEN SUBSTITUTED ISOQUINOLINOL COMPOUNDS HAVING CARDIOTONIC, PHOSPHODIESTERASE FRACTION III INHIBITING PROPERTIES AND/OR RENAL VASODILATING PROPERTIES

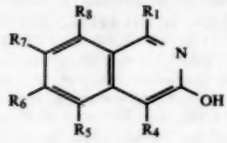
Ramesh M. Kanojia, Somerville; Robert Falotico, Belle Mead, both of N.J.; Alfonso J. Tobia, Doylestown, Pa., and Jeffery B. Press, Rocky Hill, N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Jul. 7, 1986, Ser. No. 882,655

Int. Cl.[4] A61K *31/47*; C07D *217/24*

U.S. Cl. 514—309 **16 Claims**

1. A compound having a structure that corresponds to the formula:



wherein

R_1 is a radical selected from the group consisting of hydrogen, lower alkyl, phenyl, naphthyl, halo lower alkyl, halo phenyl and halo naphthyl wherein the halogen is selected from chloro, bromo, iodo and fluoro;

R_4 is a radical selected from the group consisting of nitro, nitroso, amino, disubstituted amino wherein the substituent is a lower alkyl group having 1–5 carbon atoms, and radicals of the formula $NHCO(Y)(R)_n$ wherein Y is O or $N(H)_x$ wherein x and n are independently zero, 1 or 2 and R is hydrogen, lower alkyl, cycloalkyl having 3–6 carbon atoms, phenyl, naphthyl, lower alkyl phenyl, lower alkyl naphthyl and substituted phenyl, naphthyl, lower alkyl phenyl and lower alkyl naphthyl wherein the substituent is selected from hydroxy, lower alkoxy, lower alkylthio, halogen, halo lower alkyl, CN, NO_2, SO_2 H and COZ wherein Z is OR or NR'R" wherein R' is hydrogen or lower alkyl and R and R" are hydrogen, lower alkyl, aminolower alkyl, lower alkylaminolower alkyl and lower dialkylaminolower alkyl alkynyl having 3–5 carbon atoms or lower alkoxy; with the proviso that if Y is oxygen R is other than hydrogen and n is 1; and when n is 2, x is zero; and

R_5, R_6, R_7 and R_8 are independently selected from the group consisting of hydrogen, halogen, hydroxy, and lower alkoxy; and R_5 and R_6, R_6 and R_7 or R_7 and R_8 when taken together each form $O—CH_2—O$; and the pharmaceutically acceptable salts thereof.

16. A method for stimulating vasodilation in a mammal comprising administering to said mammal a unit dose of the pharmaceutical composition according to claim 10.

4,714,706

PYRIDYLOXY DERIVATIVES AND THEIR USE AS INSECTICIDES

Hirosi Kisida, Tokyo; Sumio Nishida, Takarazuka, both of Japan, and Makoto Hatakoshi, Seattle, Wash., assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

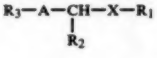
Filed May 30, 1986, Ser. No. 868,716

Claims priority, application Japan, May 30, 1985, 60-117189

Int. Cl.[4] A61K *31/44;* **C07D** *213/63, 213/64*

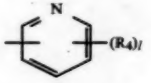
U.S. Cl. 514—345 **7 Claims**

1. A nitrogen-containing heterocyclic compound of the formula:



wherein

R_1 is either one of the following groups:

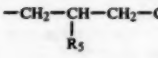


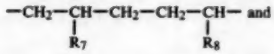
and wherein R_4 is a hydrogen atom, a halogen atom or a methyl group and l is an integer of 1 or 2;

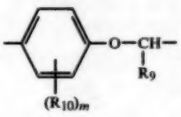
R_2 is a hydrogen atom or a methyl group;

R_3 is an alkyl group, an alkoxy group, an alkenyl group or an alkenyloxy group, each having not more than 8 carbon atoms and optionally being substituted with an alkoxy group having not more than 5 carbon atoms, a haloalkoxy group having not more than 5 carbon atoms, a halogen atom, a nitro group or an amino group;

A is one of the following groups:







wherein R_5, R_6, R_7, R_8 and R_9 are, the same or different, each a hydrogen atom or a methyl group, R_{10} is a hydrogen atom, a halogen atom or a lower alkyl group and m is an integer of 1 to 4; and

X is an oxygen atom.

6. A composition for preventing or exterminating insects which comprises as an active ingredient an insecticidally effective amount of the compound according to claim 1, and an inert carrier or diluent.

4,714,707

ARYL SUBSTITUTED HETEROCYCLES FOR TREATING GASTROINTESTINAL MOTILITY DYSFUNCTION

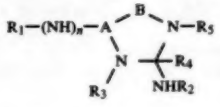
Donald E. Kuhla, Doylestown; William L. Studt, Harleysville; Henry F. Campbell, Lansdale, and John Yelnosky, Warrington, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Filed Jan. 13, 1984, Ser. No. 570,526

Int. Cl.[4] A61K *31/095, 31/39, 31/42, 31/425*

U.S. Cl. 514—361 **3 Claims**

1. A method of treating a patient suffering from a gastrointestinal motility dysfunction comprising medicating said patient with an effective gastrointestinal motility normalizing amount of a compound according to the formula



wherein:

A is nitrogen or carbon;

B is oxygen, sulfur, NR_6 of C=X;

X is oxygen or sulfur;

n is 0 or 1, provided that n is 0 when A is nitrogen;

R_1, R_2 and R_6 are each independently phenyl, substituted phenyl, hydrogen, alkyl or aralkyl;

R_3 and R_4 form a double bond and R_5 is hydrogen or alkyl when A is nitrogen;

R_4 and R_5 form a double bond and R_3 forms a double bond with A when A is carbon;

provided that at least one of R_1 and R_2 is other than hydrogen and alkyl; and

wherein:

substituted phenyl means phenyl substituted by one or more of halo, alkyl, haloalkyl, nitro, amino, alkylamino, hydroxy, aralkoxy or alkoxy;

or, a pharmaceutically acceptable acid addition salt thereof.

4,714,708

DERIVATIVES OF CIS, ENDO-2-AZABICYCLO[5.3.0]DECANE-3-CARBOXYLIC ACID, AND THEIR USE FOR TREATING HYPERTENSION

Hansjörg Urbach, Kronberg; Rainer Henning, Frankfurt am Main; Volker Teetz, Hofheim am Taunus, and Reinhard Becker, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

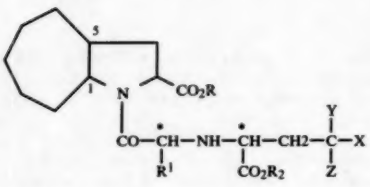
Filed Dec. 14, 1983, Ser. No. 561,230

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, 3246503

Int. Cl.[4] C07D *209/02;* A61K *31/40*

U.S. Cl. 514—412 13 Claims

1. A compound of the formula I



(I)

in which the hydrogen atoms on the bridgehead C atoms 1 and 5 have the cis-configuration relative to one another and the carboxyl group on C atom 3 is oriented endo to the bicyclic ring system and in which

R denotes hydrogen, (C_1–C_6)-alkyl, (C_2–C_6)-alkenyl or (C_6–C_{12})-aryl-(C_1–C_4)-alkyl,

R^1 denotes hydrogen, allyl, vinyl or a side chain of an optionally protected, naturally occurring α-amino-acid $R^1CH(NH_2)$—COOH,

R^2 denotes hydrogen, (C_1–C_6)-alkyl, (C_2–C_6)-alkenyl or (C_6–C_{12})-aryl-(C_1–C_4)-alkyl,

Y denotes hydrogen or hydroxyl,

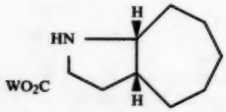
Z denotes hydrogen or

Y and Z together denote oxygen,

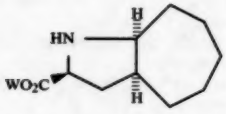
X denotes (C_1–C_6)-alkyl, (C_2–C_6)-alkenyl, (C_5–C_9)-cycloalkyl, (C_6–C_{12})-aryl which can be substituted once, twice or three times by at least one member selected from the group consisting of (C_1–C_4)-alkyl, (C_1–C_4)-alkoxy, hydroxyl, halogen, nitro, amino, (C_1–C_4)-alkylamino, di-(C_1–C_4)-alkylamino and methylenedioxy, or denotes indol-3-yl,

and its physiologically acceptable salts.

9. A compound of the formulae IIIa and/or IIIb



(IIIa)



(IIIb)

in which W denotes hydrogen, alkyl having 1–6 carbon atoms or aralkyl having 7 or 8 carbon atoms, and its salts with physiologically acceptable acids and (in the case where W=hydrogen) with physiologically acceptable bases.

4,714,709

N-(2,10-DIOXA-TRICYCLO-[5,3,1,$0^{3,8}$]-UNDECANE-5-yl)-TRYPTAMINE DERIVATIVES AND MEDICAL COMPOSITIONS THEREOF

Peter W. Thies; Samuel David, both of Hanover; Ulrich Kuehl, Gehrden; Gerd Buschmann, Hanover, and Peter Flecker, Bad Vilbel, all of Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Hanover, Fed. Rep. of Germany

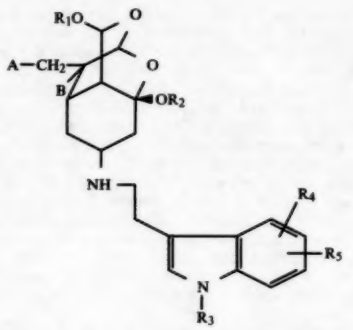
Filed Sep. 24, 1984, Ser. No. 653,707

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1983, 3335826

Int. Cl.[4] A61K *31/40;* C07D *405/12*

U.S. Cl. 514—414 16 Claims

1. A compound corresponding to the formula



I

wherein

R_1 is hydrogen, a C_1–C_4 lower alkyl group, or a benzyl group;

R_2 is a C_1–C_4 lower alkyl or lower alkanoyl group;

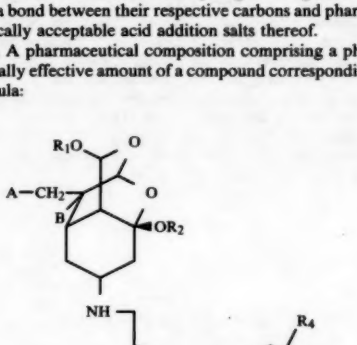
R_3 is hydrogen or a C_1–C_4 lower alkyl group;

R_4 is hydrogen, a C_1–C_4 lower alkoxy group or a hydroxy group;

R_5 is hydrogen, a C_1–C_4 lower alkoxy group, or a hydroxy group;

and A and B either are each hydrogen or together represent a bond between their respective carbons and pharmaceutically acceptable acid addition salts thereof.

14. A pharmaceutical composition comprising a pharmacologically effective amount of a compound corresponding to the formula:



I

wherein

R_1 is hydrogen, a C_1–C_4 lower alkyl group, or a benzyl group;

R_2 is a C_1–C_4 lower alkyl or lower alkanoyl group;

R_3 is hydrogen or a C_1–C_4 lower alkyl group;

R_4 is hydrogen, a C_1–C_4 lower alkoxy group or a hydroxy group;

R_5 is hydrogen, a C_1–C_4 lower alkoxy group, or a hydroxy group; and at least one additional substance selected from the group consisting of conventional pharmaceutical carriers and auxilliary substances.

4,714,710

INSECTICIDAL AND ACARICIDAL OXETANE AND THIETANE DERIVATIVES, COMPOSITIONS, AND METHOD OF USE THEREFOR

Heinrich Franke; Hartmut Joppien, and Helga Franke, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany

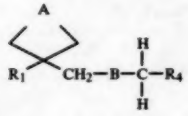
Filed Sep. 9, 1986, Ser. No. 905,275

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1985, 3532478

Int. Cl.[4] A01N *43/20;* A61K *31/335, 31/38;* C07D *305/06*

U.S. Cl. 514—430 18 Claims

1. A compound of the formula



in which

R_1 is phenyl or phenyl substituted by C_{1-4}-alkyl, halo-C_{1-4}-alkyl, C_{1-4}-alkoxy, halo-C_{1-4}-alkoxy or methylenedioxy,

R_4 is phenoxyphenyl or halophenoxyphenyl,

A is O or S and

B is CH_2 or O.

8. An insecticidal or acaricidal composition which comprises an insecticidal or acaricidal effective amount of a compound according to claim 1, in admixture with conventional additives or carriers.

14. A method of combatting insects or acarids which comprises applying to the insect, acarid or their locus, an effective insecticidal or acaricidal amount of a compound according to claim 1.

4,714,711

6-HYDROXY-2(2-HYDROXY-4-METHOXYPHENYL)-BENZOFURAN DERIVATIVES TO INHIBIT LEUKOTRIENE BIOSYNTHESIS

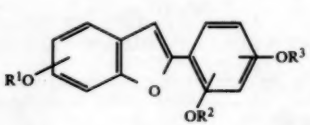
Douglas K. Miller, Westfield, N.J., and Henry Joshua, Staten Island, N.Y., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 5, 1986, Ser. No. 927,200

Int. Cl.[4] A61K *31/36*

U.S. Cl. 514—464 2 Claims

1. A method of inhibiting mammalian leukotriene biosynthesis or action which comprises administering to a patient in need of such treatment an effective amount of a compound of formula:



I

wherein:

R^1, R^2 and R^3 independently are:

(1) hydrogen; or

(2) alkyl having 1–6 carbon atoms.

4,714,712

CARBOXYLIC ACID ESTERS AND INSECTICIDES CONTAINING THEM AS THE ACTIVE INGREDIENT

Noritada Matsuo, Rochester, N.Y.; Kazunori Tsushima, Nishinomiya; Sumio Nishida, Takarazuka, and Toshihiko Yano, Ikoma, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

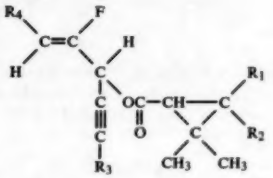
Filed Apr. 18, 1986, Ser. No. 853,607

Claims priority, application Japan, Apr. 26, 1985, 60-91971; Jun. 4, 1985, 60-121233

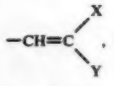
Int. Cl.[4] C07C *69/743, 69/747;* A01N *53/00*

U.S. Cl. 514—531 22 Claims

1. A compound represented by the formula,

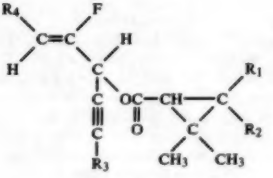


wherein R_1 represents a hydrogen atom R_2 represents a group of the formula

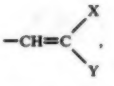


in which X and Y are the same or different and represent a methyl group, a halogen atom or a halogenated lower alkyl group, R_3 represents a hydrogen atom and R_4 represents a hydrogen atom, a lower alkyl group, a lower alkenyl group or a lower alkynyl group.

15. An insecticidal composition which comprises as an active ingredient an insecticidally effective amount of a compound represented by the formula,



wherein R_1 represents a hydrogen atom; R_2 represents a group of the formula



in which X and Y are the same or different and represent a methyl group, a halogen atom or a halogenated lower alkyl group, R_3 represents hydrogen atom; and R_4 represents a hydrogen atom, a lower alkyl group, a lower alkenyl group or a lower alkynyl group, and an inert carrier.

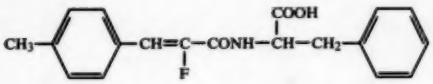
4,714,713

PHENYLALANINE DERIVATIVES AND USES THEREOF

Koji Fukushima, Tama; Yoshiko Seto, Funabashi; Kazahiro Kawada, Yokkaichi; Koji Toi, and Izumi Kumashiro, both of Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Aug. 28, 1986, Ser. No. 901,364
Claims priority, application Japan, Sep. 2, 1985, 60-193565
Int. Cl.[4] A61K *31/195*
U.S. Cl. 514—563 3 Claims

1. A phenylalanine derivative having the structural formula:



or a pharmaceutically acceptable acid addition salt thereof.

2. A pharmaceutical composition comprising (a) a phenylalanine derivative as claimed in claim 1, and (b) insulin.

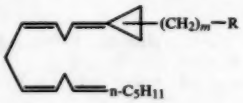
4,714,714

ARACHIDONIC ACID ANALOGS

Raj N. Misra, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 638,335, Aug. 6, 1984, Pat. No. 4,599,439. This application Mar. 7, 1986, Ser. No. 837,241
Int. Cl.[4] C07C *61/35;* A61K *31/19*
U.S. Cl. 514—572 14 Claims

1. A compound having the structure



wherein R is CH_2OH or CO_2H and m is 1 or 2.

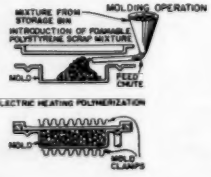
10. A composition for inhibiting allergic conditions in a mammalian species, comprising an effective amount of a compound as defined in claim 1 or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier thereof.

4,714,715

METHOD OF FORMING FIRE RETARDANT INSULATING MATERIAL FROM PLASTIC FOAM SCRAP AND THE RESULTANT PRODUCT

Benjamin Mosier, 8330 Westglen Dr., Houston, Tex. 77063

Continuation-in-part of Ser. No. 609,482, May 11, 1984, Pat. No. 4,596,682. This application Mar. 7, 1986, Ser. No. 837,185
The portion of the term of this patent subsequent to Jun. 24, 2003, has been disclaimed.
Int. Cl.[4] B29C *67/72, 67/16, 39/10, 65/04*
U.S. Cl. 521—54 14 Claims



1. The method of forming fire retardant insulation material from rigid plastic foam scrap, comprising:

(a) comminuting said scrap to obtain pieces having maximum dimensions of less than one inch;

(b) preparing a moldable mixture of said comminuted scrap with a heat-foamable thermosetting resin composition, the resin component of said composition being selected from the class consisting of phenol-formaldehyde and melamine-formaldehyde resins, said resin being in resole form and containing a blowing agent and a surfactant, from 10 to 150 parts by volume of said resin being present per 100 parts of said scrap in said mix; and

(c) applying dielectric heating to said moldable mixture in enclosed molds to obtain integrated molded bodies composed of resin-encapsulated scrap pieces, said dielectric heating being effective for rapidly foaming said resin and curing it to a predominately closed cell structure surrounding said scrap pieces.

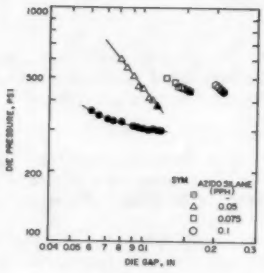
4. The fire retarding insulating material produced by the method of claim 1.

4,714,716

LIGHTLY CROSSLINKED LINEAR OLEFINIC POLYMER FOAMS AND PROCESS FOR MAKING

Chung P. Park, Pickerington, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 16, 1984, Ser. No. 672,001
Int. Cl.[4] C08J *9/14*
U.S. Cl. 521—80 12 Claims



1. A process for preparing a lightly crosslinked linear olefin polymer foam material having a substantially closed-cell structure, comprising the steps of:

(a) melt processing under pressure a linear olefin polymer or blend of linear olefin polymers,

(b) mixing a volatile blowing agent and a sufficient amount of one crosslinking agent selected from the group consisting of azido functional silanes. multifunctional vinyl monomers, and oxygen, together with said linear olefin polymer or blend of linear olefin polymers to form a flowable admixture, and,

(c) extruding said admixture through a die to a zone of lower pressure and activating said blowing agent to expand said linear olefin polymer or blend of linear olefin polymers to a closed-cell structure crosslinked with itself to form said lightly crosslinked foam material.

4,714,717

POLYESTER POLYOLS MODIFIED BY LOW MOLECULAR WEIGHT GLYCOLS AND CELLULAR FOAMS THEREFROM

Michael E. Londrigan, Safety Harbor, and Michael J. Skowronski, Largo, both of Fla., assignors to Jim Walter Resources, Inc., Birmingham, Ala.

Filed Apr. 6, 1987, Ser. No. 34,970
Int. Cl.[4] C08G *18/14*
U.S. Cl. 521—131 45 Claims

1. A polyester polyol composition suitable for use in a foam-forming reaction with an organic polyisocyanate in the manu-

facture of a polyurethane or polyisocyanurate foam and characterized by a hydroxyl number of from about 150 to about 950 and a Brookfield viscosity at 25° C. of from about 500 to about 500,000 cps, the polyester polyol being the reaction product of polycarboxylic acid and polyol components, wherein the polyol component comprises

(a) at least one alkylene glycol of the formula:

$$HO—R_1—OH$$

wherein R_1 is a straight or branched chain alkylene group having two to five carbon atoms, and is unsubstituted or substituted by at least one member selected from the group consisting of halogen, hydroxy, nitro and amino,

(b) at least one higher alkylene glycol, and

(c) optionally at least one additional polyol.

4,714,718

NYLON MOLDINGS AND THEIR PRODUCTION

Peter Horn, Heidelberg; Edwin Baumann, Schifferstadt, and Matthias Marx, Bad Duerkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 2, 1985, Ser. No. 782,926

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1984, 3436359

Int. Cl.⁴ C08L *77/00*

U.S. Cl. 521—134 **7 Claims**

1. A cellular nylon molding having a substantially cell-free skin and prepared by activated alkaline lactam polymerization in a mold, which comprises

(A) 70–99 parts by weight of polycaprolactam,

(B) 1–30 parts by weight of a polyamide selected from the group consisting of an aliphatic polyamide having a melting point of below 200° C. and/or an aromatic/aliphatic polyamide having a glass transistion temperature of from 100° to 170° C. and having a K value (0.5% strength in 1:1 phenol-/o-dichlorobenzene) of from 30 to 75 which is amorphous or contains less than 30% of crystalline components and has a solubility of not less than 5% by weight in caprolactam at 120° C., and

(C) 3 to 100% by volume, based on (A) and (B), of gas-filled cells having a mean diameter of less than 0.2 mm.

4,714,719

CATALYST FOR PREPARATION OF POLYURETHANE AND PROCESS FOR THE PREPARATION

Harumasa Yamasaki, Wakayama; Masayoshi Morii, Naga; Yukinaga Yokota, Sennan; Akira Mamada, and Yoshiyuki Nabata, both of Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan

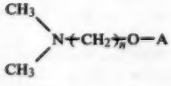
Filed Nov. 4, 1986, Ser. No. 927,287

Claims priority, application Japan, Nov. 13, 1985, 60-254085; Nov. 13, 1985, 60-254087

Int. Cl.⁴ C08G *18/18*

U.S. Cl. 521—163 **7 Claims**

1. A process for preparing a polyurethane which comprises reacting a polyol and a polyisocyanate in the presence of a catalyst comprising a compound having the formula:



in which n is an integer of 2 to 12, A is $CH_2CHRCH_2NH_2$ and R is hydrogen or methyl.

4,714,720

BROMINATED POLYETHERPOLYOLS, PROCESS FOR THEIR PREPARATION AND THE USE OF BROMINATED POLYETHERPOLYOLS IN THE MANUFACTURE OF RIGID POLYURETHANE FOAMS

André Collin, Ligny, Belgium, assignor to Solvay & Cie (Société Anonyme), Brussels, Belgium

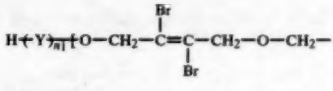
Filed Oct. 10, 1986, Ser. No. 917,473

Claims priority, application France, Oct. 10, 1985, 85 15166

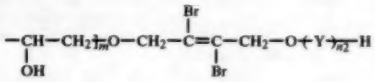
Int. Cl.⁴ C08G *18/14*

U.S. Cl. 521—171 **6 Claims**

1. Brominated polyetherpolyols of general formula



(I)



in which:

Y denotes oxyalkylene radicals derived from ethylene oxide, propylene oxide and/or butylene oxide,

m denotes a number such that $1 \leqq m \leqq 2$, and

n_1 and n_2 denote numbers such that $1 \leqq (n_1 \leqq n_2) \leqq 5$.

4,714,721

COMPOSITE PLASTICS-BASED MATERIAL FOR PROSTHESIS PURPOSES

Henning Franek, Braunfels-Tiefenbach; Heinz Broemer, Wetzlar; Klaus Deutscher, deceased, late of Wetzlar (by Anneliese Deutscher, heir), and Roland Schaefer, Friedrichsdorf, all of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

PCT No. PCT/DE85/00172, § 371 Date Feb. 5, 1986, § 102(e) Date Feb. 5, 1986, PCT Pub. No. WO86/00021, PCT Pub. Date Jan. 3, 1986

PCT Filed May 22, 1985, Ser. No. 842,259

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1984, 3421157

Int. Cl.⁴ A61K *6/06, 49/04;* **A61L** *25/00*

U.S. Cl. 523—113 **26 Claims**

1. A composition for prosthesis purposes, comprising a polymerizable material and a radiopaque filler, wherein the radiopaque filler comprises an oxide of gadolinium and an oxide of strontium as a component combination which causes x-ray absorption.

4,714,722

FLY ASH REACTIVE FILLER FOR DEHYDRATING AND BONDING AQUEOUS POLYMERIC COMPOSITIONS

Daniel J. Najvar; Brian G. Pope, both of Baton Rouge, La., and Norman R. Loeffler, Tulsa, Okla., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 747,593, Jun. 24, 1985, abandoned. This application Aug. 20, 1986, Ser. No. 898,858

Int. Cl.⁴ C08J *9/32*

U.S. Cl. 523—218 **12 Claims**

1. A method for accelerating the dehydration of an aqueous polymeric dispersion composition comprising polymeric particles and mineral filler dispersed in an aqueous medium and improving bonding of the solids contained therein, the method consisting essentially of adding Class C fly ash as the sole water-reducing agent to said composition in an amount sufficient to significantly reduce the dehydration time of said composition compared to compositions which are identical save for the absence of Class C fly ash.

4,714,723

ADHESIVE SOLUTIONS, MORE ESPECIALLY FOR WATER-ACTIVATABLE ADHESIVE COATINGS ON WALLPAPERS

Lutz Hoppe, and Eugen Reinhardt, both of Walsrode, Fed. Rep. of Germany, assignors to Wolff Walsrode Aktiengesellschaft, Walsrode, Fed. Rep. of Germany

Filed Dec. 18, 1985, Ser. No. 810,450

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447206

Int. Cl.[4] C08L 1/26, 1/08; C09J 3/04

U.S. Cl. 524—42 6 Claims

1. An adhesive solution, especially for wallpapers prepared from:

(1) a from 2 to 20%, by weight, dispersion of cellulose ethers in an aliphatic C_1–C_4 alcohol; and

(2)

(a) from 0.05 to 2.0%, by weight, of an aqueous solution of methyl cellulose ether and/or hydroxyalkyl methyl cellulose ether which is soluble in water and in a mixture of methanol and methylene chloride and which is swellable in methanol or

(b) from 2 to 40%, by weight, of an aqueous solution of a hydrolyzate, of a copolymer of styrene and acrylonitrile, which is also soluble in methanol, an alcohol-to-water weight ratio of from 0.5:1 to 3.5:1 having to be maintained in the adhesive solution.

4,714,724

DIBROMONEOPENTYL PHOSPHATE MELAMINE SALT FLAME RETARDANT

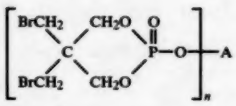
Alfred K. Jung, Ridgewood; Joseph Silberberg, Brooklyn, and Edward D. Weil, Hastings-on-Hudson, all of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 146,583, May 5, 1980, Pat. No. 4,373,103. This application Sep. 29, 1982, Ser. No. 426,562

Int. Cl.[4] C08K 5/34

U.S. Cl. 524—100 2 Claims

1. A composition comprising a normally flammable polymer of styrene and a minor proportion, sufficient to impart flame-retardant properties to said compositions, of a salt of 5,5-bis(-bromomethyl)-2-hydroxy-2-oxo-1,3,2-dioxaphosphorinane having the structure



where A is a protonated amino-s-triazine group and n is an integer corresponding to the valence of A.

4,714,725

MEMBRANES

Brian N. Hendy, Middlesbrough, and John W. Smith, Liverpool, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 793,756, Nov. 1, 1985, abandoned. This application Apr. 6, 1987, Ser. No. 35,235

Claims priority, application United Kingdom, Nov. 12, 1984, 8428525

Int. Cl.[4] C08K 5/15; C08L 71/04

U.S. Cl. 524—108 7 Claims

1. A solution comprising a sulphonated polyaryletherketone and a solvent mixture which contains at least three components each of which is a non-solvent or poor solvent for the sulphonated polyaryletherketone and which are

(a) a liquid or a low melting solid containing at least one hydroxylic group and having a delta-H with a value of at least 8;

(b) a liquid or a low melting solid having a delta-D with a value of at least 8 and a delta-P with a value of not more than 3; and

(c) a liquid or a low melting solid having a delta-P with a value of at least 8.5 and a delta-H with a value of not more than 3;

wherein the solvent mixture forms a single liquid phase and none of the components of the solvent mixture reacts or complexes with another of the components of the solvent mixture or with the sulphonated polyaryletherketone.

5. The solution of claim 1 in which component (a) of the solvent mixture has a delta-H of at least 8, a delta-D of not more than 8 and a delta-P of at least 6; component (b) of the solvent mixture has a delta-D of at least 8, a delta-P of not more than 3 and a delta-H of not more than 4; and component (c) of the solvent mixture has a delta-P of at least 8.5, a delta-H of not more than 3 and a delta-D of at least 7.5.

6. The solution of claim 5 wherein the solvent mixture contains at least 20% by weight of 1,4-dioxane, at least 10% by weight of acetonitrile and not more than 40% by weight of water, the total amounts of the three components aggregating to 100% by weight.

4,714,726

LOW TEMPERATURE SINGLE STEP CURING POLYIMIDE ADHESIVE

Celia H. Ketley, Beverly, Mass., assignor to W. R. Grace & Co., Lexington, Mass.

Filed Jun. 4, 1986, Ser. No. 870,461

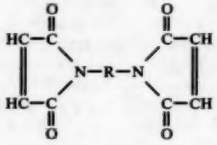
Int. Cl.[4] C08K 5/15

U.S. Cl. 524—11 12 Claims

1. A silver-filled paste comprising

(a) silver powder;

(b) a resin having the formula:



wherein R comprises a divalent linking group; and

(c) a solvent for the resin which comprises one or more electron donor groups.

4,714,727

AQUEOUS EMULSION COATING FOR INDIVIDUAL FIBERS OF A CELLULOSIC SHEET PROVIDING IMPROVED WET STRENGTH

Robert M. Hume, III, Cottage Grove, Minn., assignor to H. B. Fuller Company, St. Paul, Minn.

Filed Jul. 25, 1984, Ser. No. 634,372

Int. Cl.[4] C08J 0/00

U.S. Cl. 524—271 15 Claims

1. A basic emulsion composition, that can provide water resistance to a cellulosic sheet while preserving its affinity with aqueous compositions, which comprises in an emulsion:

(a) a major proportion of water;

(b) an effective water resistance providing amount comprising about 0.02 to 15 wt-% based upon the total emulsion composition of a mixture of a wax compound and a rosin compound;

(c) an effective amount comprising about 0.01 to 5 wt-% based upon the total emulsion composition of an emulsion stabilizer comprising the reaction product of a relatively strong basic component and a relatively weak acidic component; and

(d) an effective amount comprising about 0.01 to 10 wt-% of the total emulsion composition of a chelating agent result-

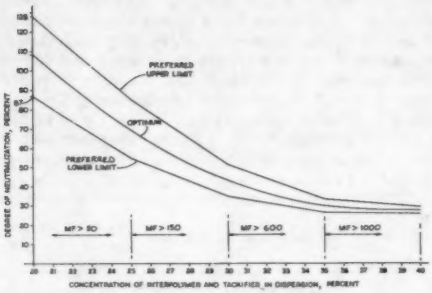
ing in the chelation of ionic species in the water and in the cellulosic sheet.

4,714,728

AQUEOUS DISPERSIONS OF ACIDIC ETHYLENE INTERPOLYMERS

Stephen L. Graham, Houston, and David O. Plunkett, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 18, 1986, Ser. No. 887,846
Int. Cl.[4] C08F 2/16, 8/00, 8/30
U.S. Cl. 524—272 34 Claims



1. An aqueous dispersion, consisting essentially of:

(a) an ethylene interpolymer having an acid number of at least about 117, a melt flow of at least about 50, and comprising from 15 to 24 percent, by weight of said interpolymer, of interpolymerized ethylenically unsaturated carboxylic acid;

(b) from about 5 to about 2000 parts by weight per 100 parts of said interpolymer of a rosin tackifier having an acid number of at least about 76 and a melt flow of at least 50, said tackifier being compatible and codispersible with said interpolymer;

(c) water in an amount sufficient to provide a solids content of the dispersion of from about 10 to about 60 percent; and

(d) water soluble alkali in an amount effective to obtain a degree of neutralization of from about 20 to about 130 percent, to disperse at least 99 weight percent of said interpolymer and said tackifier, and to provide a viscosity of the dispersion which is less than about 1500 Pa-s.

21. A method of preparing an aqueous dispersion, comprising the steps of:

(a) mixing components consisting essentially of:

(i) an ethylene interpolymer having an acid number of at least about 117, a melt flow of at least about 80, and comprising from 15 to 24 percent, by weight of said interpolymer, of interpolymerized ethylenically unsaturated carboxylic acid;

(ii) from about 5 to about 2000 parts by weight per 100 parts of said interpolymer of a rosin tackifier having an acid number of at least about 76 and a melt flow of at least 50, said tackifier being compatible and codispersible with said interpolymer;

(iii) water in an amount sufficient to provide a solids content of the mixture of from about 10 to about 60 percent; and

(iv) water soluble alkali in an amount effective to obtain a degree of neutralization of from about 20 to about 130 percent; and

(b) heating and agitating said mixture sufficiently to disperse therein at least 99 weight percent of said interpolymer and said tackifier.

4,714,729

ULTRAVIOLET LIGHT-STABLE IGNITION RESISTANT THERMOPLASTIC MOLDING COMPOSITIONS

Mark R. Christy, and Ernest L. Ecker, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 27, 1986, Ser. No. 822,723
Int. Cl.[4] C08K 5/10
U.S. Cl. 524—281 13 Claims

1. An ignition resistant composition comprising in admixture a resin selected from the group consisting of acrylonitrile butadiene styrene, polystyrene, styrene acrylonitrile/ethylene propylene diene rubber terpolymer blends, and mixtures thereof, and 2,4,6-trihalophenyl tribromoneopentyl carbonate, pentahalophenyi 2,4,6-trihalophenyl carbonate, or a mixture thereof, the halogen being Br, Cl, I, F, and mixtures thereof in an amount effective to improve ignition resistance and at least one property selected from the group consisting of ultraviolet light stability and impact strength.

4,714,730

ACID MODIFIED ADHESIVE COMPOSITIONS

Paul C. Briggs, Charlestown, and Donald E. Gosiewski, West Peabody, both of Mass., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Jun. 4, 1986, Ser. No. 870,710
Int. Cl.[4] C08K 5/09
U.S. Cl. 524—321 27 Claims

1. An adhesive composition comprising:

(a) an acrylic or methacrylic ester based monomer;

(b) a polymerization catalyst;

(c) a sulfur-bearing composition selected from the group of chlorosulfonated polyethylene and a mixture of sulfonyl chloride with chlorinated polyethylene in a polymerizable vinyl monomer or a mixture of monomers and a polymerization catalyst; and

(d) an effective amount of a strong organic acid wherein the acid has a dissociation constant (K_d or K_{1d}) within the range of from about 1×10^{-4} to about 10×10^{-1} or wherein an 0.2N aqueous solution of the acid has a pH in the range of from about 1.2 to 2.3.

4,714,731

METAL CONTAINER COATING COMPOSITIONS COMPRISING STABLE EMULSIONS OF WATER RESISTANT POLYVINYL ALCOHOL-STABILIZED VINYL CHLORIDE-ETHYLENE COPOLYMERS

John G. Iacoviello, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 747,134, Jun. 20, 1985, Pat. No. 4,678,829, which is a continuation-in-part of Ser. No. 622,592, Jun. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 572,726, Jan. 20, 1984, abandoned. This application Mar. 13, 1987, Ser. No. 25,769
The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.
Int. Cl.[4] C08F 2/16; C08K 3/20
U.S. Cl. 524—459 18 Claims

1. A metal container coating composition comprising

(a) about 45 to 95 wt % of a stable aqueous vinyl chlorideethylene copolymer emulsion, the copolymer having a T_g from 0° to 50° C., consisting essentially of about 65 to 90 wt % vinyl chloride, about 5 to 35 wt % ethylene, and up to about 10 wt % C_3–C_{10} alkenoic acid or nitrogen-containing comonomer, provided that when the nitrogen-containing comonomer is acrylamide up to about 1 wt % is present, and prepared by the emulsion polymerization of the monomers in the presence of an an emulsifying system consisting essentially of about 3 to 15 wt % polyvinyl alcohol which is 70 to 91 mole % hydrolyzed, which emulsion polmerization process comprises

forming an aqueous emulsion reaction mixture containing

substantially all the polyvinyl alcohol and a portion of the total vinyl chloride monomer,

pressurizing the reaction mixture with an ethylene pressure sufficient to provide the copolymer with a 5 to 35 wt % ethylene content,

initiating the reaction mixture by the addition of a free radical generating source and continuing polymerization until the rate of polymerization begins to decrease,

adding the remaining vinyl chloride over a period of time while continuing polymerization until the reaction is no longer self-sustaining, and

removing the unreacted ethylene and reducing the vinyl chloride free monomer content of the emulsion,

(b) about 5 to 40 wt % of a crosslinking resin, based on emulsion solids,

(c) up to about 10 wt % organic solvent, and

(d) 0 to 5 wt % acid catalyst.

4,714,732

RUBBER COMPOSITION FOR TIRE INNER LINER

Takashi Hoshino, Tokyo, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Aug. 25, 1986, Ser. No. 899,672

Claims priority, application Japan, Sep. 12, 1985, 60-200589

Int. Cl.[4] C08K *5/01;* **C08L** *9/00, 15/02*

U.S. Cl. 524—474 **5 Claims**

1. A rubber composition for an inner liner of a tire, comprising:

a rubber component including halogenated butyl rubber ranging from 60 to 100 parts by weight, and diene rubber not more than 40 parts by weight; and

a hydrocarbon oil softener ranging from 3 to 15 parts by weight relative to 100 parts by weight of said rubber component, said softener including a paraffin component constituting not less than 60 weight%, and an aromatics component constituting not more than 5 weight%;

said rubber composition having a storage elastic modulus at 10° C. after vulcanization, not higher than 1.4×10^8 dyn/cm^2, and a storage elastic modulus at −45° C., not higher than 8.0×10^9 dyn/cm^2.

4,714,733

RUBBER COMPOSITION

Kunio Itoh; Takeshi Fukuda, and Hiroshi Yoshioka, all of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1987, Ser. No. 34,640

Claims priority, application Japan, Feb. 13, 1987, 62-30993

Int. Cl.[4] C08K *3/36;* **C08L** *83/06, 7/00, 83/04*

U.S. Cl. 524—493 **6 Claims**

1. A rubber composition which comprises:

(A) 100 parts by weight of a combination composed of

(A-1) from 50 to 97% by weight of a rubbery copolymer of ethylene and propylene, and

(A-2) from 50 to 3% by weight of an organopolysiloxane represented by the average unit formula

$$R^1_nSiO_{(4-n)/2},$$

in which R^1 is a substituted or unsubstituted monovalent hydrocarbon group, the groups denoted by R^1 in a molecule having at least two aliphatically unsaturated linkages, and the subscript n is a positive number in the range from 1.90 to 2.05, and having an average degree of polymerization of at least 500;

(B) from 5 to 200 parts by weight of a reinforcing silica filler having a specific surface area of at least 50 m^2/g;

(C) from 1 to 20 parts by weight of a first organosilane compound represented by the general formula

$$R^2_mSi(OX)_{4-m},$$

in which R^2 is a substituted or unsubstituted monovalent hydrocarbon group selected from the class consisting of alkyl groups having 1 to 6 carbon atoms, cycloalkyl groups having 5 to 8 carbon atoms, phenyl group, vinyl group and 3,3,3-trifluoropropyl group, X is an atom or group selected from the class consisting of hydrogen atom, alkyl groups having 1 to 4 carbon atoms and alkoxy-substituted alkyl groups having 2 to 6 carbon atoms and the subscript m is zero, 1 or 2, or a partial hydrolysis-condensation product thereof having an average degree of polymerization not exceeding 100; and

(D) from 0.1 to 10 parts by weight of a second organosilane compound having a thiocarbamyl group in a molecule represented by the general formula

$$(R^3O)_a(R^4)_{3-a}Si—R^5—S_b—CS—NR^6_2,$$

in which $R^3$is a monovalent group selected from the class consisting of alkyl groups having 1 to 4 carbon atoms, alkoxy-substituted alkyl groups having 2 to 6 carbon atoms, cycloalkyl groups having 5 to 8 carbon atoms and phenyl group, $R^4$is a monovalent hydrocarbon group selected from the class consisting of alkyl groups having 1 to 4 carbon atoms, cycloalkyl groups having 5 to 8 carbon atoms and phenyl group, R^5 is a divalent hydrocarbon group of a straightly linear or cyclic structure having 1 to 8 carbon atoms, R^6 is a hydrogen atom or a monovalent hydrocarbon group selected from the class consisting of alkyl groups having 1 to 4 carbon atoms and phenyl group, the subscript a is 1, 2 or 3 and the subscript b is a positive integer of from 2 to 6.

4,714,734

RUBBER COMPOUNDS

Takatsugu Hashimoto, Higashiyamato; Akihiro Maehara, Musashimurayama; Seisuke Tomita, Tokorozawa; Yuichi Funahashi; Junichiro Watanabe, both of Ota; Kazuo Sugiura, and Hironori Matsumoto, both of Tokyo, all of Japan, assignors to Bridgestone Corp.; Toshiba Silicone Co., Ltd. and Japan Synthetic Rubber Co., Ltd., all of Tokyo, Japan

Filed Feb. 25, 1986, Ser. No. 832,776

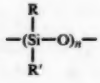
Claims priority, application Japan, Feb. 26, 1985, 60-37034; Feb. 26, 1985, 60-37035

Int. Cl.[4] C08K *3/04*

U.S. Cl. 524—496 **21 Claims**

1. A rubber compound comprising

100 parts by weight of a polyorganosiloxane of the following general formula



wherein R and R′ are independently selected from the group consisting of an aromatic ring substituent, an alkyl substituent, and a halogenated alkyl substituent; n is an integer of not smaller than 3; and wherein at least 6 mole percent of said substituents are an aromatic ring substituent having a Small's molecular attraction constant of not smaller than 700; and

2 to 200 parts by weight of carbon black having an average particle size not larger than 1000 angstroms.

4,714,735

ORIENTED ELASTOMERIC FILM AND METHOD OF MANUFACTURE

William J. Hodgson, Jr., Baytown, and Jeffrey A. Middlesworth, Webster, both of Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed May 8, 1985, Ser. No. 732,127

Int. Cl.[4] C08L *77/00, 45/00, 33/04, 35/02*

U.S. Cl. 524—514 **9 Claims**

1. An oriented film having a blend composition comprising from 10 to 40 weight percent of an olefinic elastomers, from 2

to 10 weight percent of a normally liquid process oil, and from 50 to 80 weight percent of a thermoplastic ethylene copolymer, said film being stretch oriented in draw ratio of between 1.3:1 and 6:1 and being dimensionally stable, thermally unstable in the stretch oriented condition and contractible to a thermally stable and elastic condition by application of heat.

4,714,736

STABLE POLYAMIDE SOLUTIONS

Roger L. Juhl; James L. Potter, and Sotiros C. Polemenakos, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 29, 1986, Ser. No. 869,152

Int. Cl.[4] C08J 3/06; C08L 77/06; C08G 69/46

U.S. Cl. 524—608 **3 Claims**

1. A method for storing an uncrosslinked polyamide solution, comprising the steps of:

reacting an aqueous polyalkylene polyamine with a saturated aliphatic dicarboxylic acid having from 3 to 10 carbon atoms to prepare an uncrosslinked polyamide;

diluting the polyamide with water to form an aqueous polyamide solution having a concentration of polyamide of from about 30% to about 60% by weight;

acidifying the aqueous polyamide solution with sufficient acid to reduce the pH of the solution to below about 9; and

storing the acidified uncrosslinked solution at ambient temperature for more than three days.

4,714,737

PROCESS AND COMPOSITION

Dwight J. Patterson, Evansville, Ind., assignor to General Electric, Mt. Vernon, Ind.

Filed Dec. 19, 1986, Ser. No. 943,460

Int. Cl.[4] C08L 69/00; C08J 3/00

U.S. Cl. 524—611 **6 Claims**

1. A method for producing a high molecular weight aromatic polycarbonate composite material which comprises

a. coating the reinforcing material with a catalyst system which polymerizes aromatic cyclic carbonate oligomers to high molecular weight aromatic polycarbonate under appropriate conditions;

b. contacting the catalyst system coated reinforcing material with a mixture of aromatic cyclic carbonate oligomers and;

c. polymerizing the mixture of aromatic cyclic carbonate oligomers to high molecular weight aromatic polycarbonate.

4,714,738

ACRYLIC POLYMERS CONTAINING HYDROLYZABLE MOIETIES FROM ORGANOSILANE COMPOUNDS

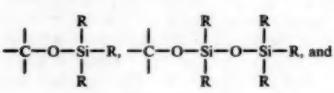
Wen H. Chang, Gibsonia; Paul J. Prucnal; John R. Peffer, both of Pittsburgh; Edward L. Dufford, Sarver, and Ronald R. Ambrose, Allison Park, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 30, 1985, Ser. No. 728,973

Int. Cl.[4] C08F 8/00

U.S. Cl. 525—58 **23 Claims**

1. An ungelled acrylic resin composition comprising an acrylic polymer having in a molecule thereof at least one group containing a silicon atom said group selected from:



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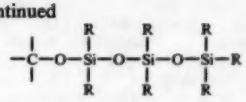


wherein each R independently is selected from the group of moieties consisting of Y, hydrogen, a C_1–C_{10} group joined to Si through an Si-C linkage, and OR^7 in which R^7 represents alkyl having at least 4 carbon atoms, aryl, alkylaryl, arylalkyl, aryloxyalkyl, or alkyloxyalkyl, wherein Y represents an easily hydrolyzable group; provided that said acrylic resin composition contains an amount of easily hydrolyzable Y moieties such that the ratio of the number of grams of said ungelled acrylic resin composition to equivalents of easily hydrolyzable Y moieties in said ungelled acrylic resin composition is in a range of from 40 to 667.

4,714,739

CURABLE SILICONE SEMI-INTERPENETRATING POLYMER NETWORKS AND METHODS OF MAKING SAME

Barry C. Arkles, Oreland, Pa., assignor to Petrarch Systems Inc., Bristol, Pa.

Continuation-in-part of Ser. No. 370,000, Apr. 20, 1982, Pat. No. 4,500,688. This application Feb. 6, 1984, Ser. No. 577,113

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1983, 3314355; Japan, Apr. 20, 1983, 58-68531

Int. Cl.[4] C08L 83/05, 9/00

U.S. Cl. 525—92 **29 Claims**

1. A melt processable composition comprising a polymeric thermoplastic matrix, a hydride group-containing silicone, a non-silicone polymer containing at least one unsaturated group, and a catalyst which will catalyze the reaction of said polymer with said hydride group-containing silicone, said silicone and said polymer being selected and present in sufficient amounts to react with each other by vulcanization within said polymeric thermoplastic matrix to form a silicone semi-interpenetrating polymer network, said vulcanization of said silicone and said polymer being initiated during thermoplastic melt-processing of said composition.

4,714,740

LOW COEFFICIENT OF FRICTION NYLON BLEND

Michael C. Lee, Troy, and Mark A. Golden, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 812,849, Dec. 23, 1985. This application Jul. 14, 1986, Ser. No. 892,625

Int. Cl.[4] C08L 77/06

U.S. Cl. 525—179 **1 Claim**

1. A thermoplastic polyblend molding composition consisting of an intimate admixture of

(a) 90 to 60% by weight of total polyblend composition of nylon 66,

(b) 5 to 40% by weight of total polyblend composition of a thermoplastic additive of polymethylmethacrylate, and

(c) 5 to 20% by weight of total polyblend composition of a thermoplastic additive of polytetrafluoroethylene,

the total of (a) (b) and (c) being equal to 100%, whereby said thermoplastic additives improve the friction and wear properties of said polyblend composition.

4,714,741

DEGRADABLE POLYMER COMPOSITION

Dennis C. Balduff, Toledo, and Saleh A. Jabarin, Holland, both of Ohio, assignors to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 856,638, Apr. 25, 1986, abandoned, which is a continuation of Ser. No. 726,487, Apr. 24, 1985, abandoned, which is a continuation of Ser. No. 524,279, Aug. 18, 1983, abandoned. This application Oct. 17, 1986, Ser. No. 919,981

Int. Cl.[4] C08L *23/06*

U.S. Cl. 525—185 1 Claim

1. A degradable polymer composition comprising:

(a) an ethylene-carbon monoxide copolymer only in an amount sufficient to provide a total of substantially about 0.005 to 0.05 percent by weight of CO in the composition; and

(b) a low density polyethylene constituting substantially the balance of the composition.

4,714,742

CYANAMIDE DERIVATIVES AS VULCANIZATION RATE MODIFIERS

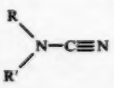
Roger J. Hopper, and Carl R. Parks, both of Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 20, 1986, Ser. No. 920,531

Int. Cl.[4] C08C *19/20, 19/22*

U.S. Cl. 525—346 7 Claims

1. A sulfur vulcanizable composition comprising a sulfur vulcanizable rubber and at least one compound having the general structural formula:



(I)

wherein R and R′ may be the same or different radicals selected from the group comprised of alkyl radicals of 1–20 carbon atoms, aralkyl radicals of 7–20 carbon atoms and alkenyl radicals of 3–20 carbon atoms wherein the alkenyl function is at the two position or greater.

4,714,743

EPOXY-POLYESTER GRAFT COPOLYMERS SUITABLE FOR CHIP RESISTANT COATING COMPOSITION I

Panagiotis I. Kordomenos, Mt. Clemens, and Andrew H. Dervan, Grosse Pointe Farms, both of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 23, 1986, Ser. No. 877,639

Int. Cl.[4] C08G *59/16, 63/66*

U.S. Cl. 525—418 8 Claims

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight ($\overline{M}_n$) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having reactive hydroxyl groups, said lactone monomers being polymerized and reacted with hydroxyl groups of the precursor without chain extension of the precursor to form pendent hydroxyl terminated polymer chains, wherein the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers, said precursor being the reaction product of:

(i) modified diepoxide being the product of polymerization of lactone monomers in the presence of diepoxide which has been chain extended with diphenol, wherein said lactone monomers, reacted to form said modified diepoxide, and said diphenol are employed in a molar ratio of at least about 2:1, respectively; and

(ii) hdyroxy functional secondary amine in chain termination reaction in about 1:1 equivalent ratio.

4,714,744

EPOXY-POLYESTER GRAFT COPOLYMERS SUITABLE FOR CHIP RESISTANT COATING COMPOSITION I

Panagiotis I. Kordomenos, Mt. Clemens, and Andrew H. Dervan, Grosse Pointe Farms, both of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 23, 1986, Ser. No. 877,908

Int. Cl.[4] C08G *59/16, 63/18, 63/20*

U.S. Cl. 525—438 10 Claims

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight (M_n) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having reactive hydroxyl groups, said lactone monomers being polymerized and reacted with hydroxyl groups of the precursor without chain extension of the precursor to form pendent hydroxyl terminated polymer chains, wherein the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers, said precursor being the reaction product of:

(i) modified diepoxide being the product of polymerization of lactone monomers in the presence of diepoxide which has been chain extended substantially simultaneously with diphenol and dicarboxylic acid, said diepoxide being reacted substantially simultaneously with said diphenol and dicarboxylic acid in amounts sufficient to give a weight per epoxide of between about 500 and about 2500, wherein said lactone monomers reacted to form said modified diepoxide and the combined said diphenol and dicarboxylic acid, are employed in a molar ratio of at least about 2:1, respectively; and

(ii) hydroxy functional secondary amine in chain termination reaction in about 1:1 equivalent ratio.

4,714,745

EPOXY-POLYESTER GRAFT COPOLYMERS SUITABLE FOR CHIP RESISTANT COATING COMPOSITION I′

Panagiotis I. Kordomenos, Mt. Clemens, and Andrew H. Dervan, Grosse Pointe Farms, both of Mich., assignors to E. I. duPont de Nemours and Company, Wilmington, Del.

Filed Jun. 23, 1986, Ser. No. 877,645

Int. Cl.[4] C08G *63/20, 59/16*

U.S. Cl. 525—438 9 Claims

1. A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight ($\overline{M}_n$) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having reactive hydroxyl groups, said lactone monomers being polymerized and reacted with hydroxyl groups of the precursor without chain extension of the precursor to form pendent hydroxyl terminated polymer chains, wherein the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers, said precursor being the reaction product of:

(i) modified diepoxide being the product of polymerization of lactone monomers in the presence of diepoxide which has been chain extended with dicarboxylic acid, wherein said lactone monomers, reacted to form said modified diepoxide, and said dicarboxylic acid are employed in a molar ratio of at least about 2:1, respectively; and

(ii) hydroxy functional secondary amine in chain termination reaction in about 1:1 equivalent ratio.

4,714,746

PROCESS FOR THE PREPARATION OF AROMATIC POLYESTER-CARBONATES HAVING IMPROVED NOTCHED IMPACT STRENGTH, AND POLYESTER-CARBONATES PREPARED THEREBY AND THEIR USE FOR THE PRODUCTION OF MOULDINGS, FILMS AND COATINGS

Volker Serini; Dieter Freitag, both of Krefeld, and Dietrich Rathmann, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Oct. 14, 1986, Ser. No. 918,771

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1985, 3537664

Int. Cl.⁴ C08L *67/02*

U.S. Cl. 525—439 **10 Claims**

1. Process for the preparation of aromatic polyester-carbonates based on diphenols, aromatic dicarboxylic acids, carbonic acid derivatives, characterized in that

I. 10 to 90% by weight, relative to the sum of I +II, of a polyester-carbonate having an ester group content of 5 to 35 mol %, relative to the sum of the ester and carbonate groups of the polyester-carbonate I, and

II. 90 to 10% by weight, relative to the sum of I +II, of a polyester-carbonate having an ester group content of 60 to 95 mol %, relative to the sum of ester and carbonate groups of the polyester-carbonate II, are homogenized in the melt.

9. Polyester-carbonates produced by the process according to claim 1 wherein after mixing in the melt, at least 50% by weight of component I has an ester group content of 5 to 35 mol-% and at least 50% by weight of component II has an ester group content of 60 to 95 mol-%.

4,714,747

MANUFACTURE OF BUTYL RUBBER

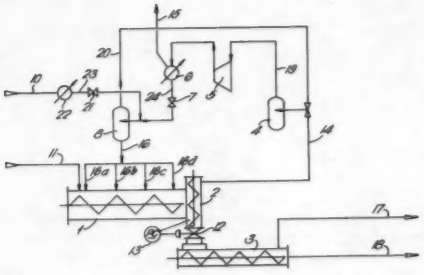
Mario Bruzzone; Silvano Gordini, both of San Donato Milanese, and Ken Wyllie, Milan, all of Italy, assignors to Enichem Elastomeri S.p.A., Italy

Filed Jun. 16, 1986, Ser. No. 874,851

Claims priority, application United Kingdom, Jun. 17, 1985, 8515254

Int. Cl.⁴ C08F *2/14, 236/04*

U.S. Cl. 526—64 **9 Claims**



1. A continuous process for the manufacture of butyl rubber by the polymerisation of a monomer mixture comprising essentially at least 90% by weight of isobutene and 0.5 to 10% by weight (based on the weight of mixture) of at least one conjugated diene comonomer by continuously supplying a feed stream of the monomer mixture and halogenated hydrocarbon polymerisation medium together with catalyst to an extruder type reactor and polymerising therein, characterised by the steps of (a) cooling the feed stream of monomers and halogenated hydrocarbon polymerisation medium to a polymerisation temperature of −70° C. to +15° C. by vapourisation of a portion thereof under reduced pressure; (b) supplying the cooled feed stream to a reactor which is a self-cleaning screw extruder and polymerising therein under boiling plug-flow conditions at a constant pressure of 0.1 to 4 Bar using a "high" temperature aluminium halide catalyst and (c) removing, at the reactor outlet, polymer product at a concentration of at least 50% for recovery and a vapourised mixture of unreacted monomers and polymerisation medium, for recycle, whereby no separate refrigerant is required.

4,714,748

NOVEL POLYTETRAFLUOROETHYLENE FINE POWDER

Jyuzaemon Hoashi, Ibaraki; Syozo Fumoto, Suita, and Kiyoshi Oshita, Sakai, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 721,508, Apr. 11, 1985, abandoned, which is a continuation of Ser. No. 561,048, Dec. 13, 1983, abandoned. This application Apr. 29, 1986, Ser. No. 858,836

Claims priority, application Japan, Dec. 14, 1982, 57-219569

Int. Cl.⁴ C08F *14/26*

U.S. Cl. 526—255 **8 Claims**

1. A polytetrafluoroethylene fine powder having an average molecular weight of at least 6,000,000, an amorphous index larger than 0.1 and a number average primary particle size of 0.1 to 0.8 micron and further having a first clear endothermic peak at a temperature of 347±3° C. and a second endothermic peak or shoulder at a temperature between 330° C. and the temperature of said first endothermic peak on a crystalline melting chart recorded by a differential scanning calorimeter.

4,714,749

FULLY SATURATED PETROLEUM RESIN AND HOT MELT PRESSURE SENSITIVE ADHESIVE FORMULATIONS UTILIZING SAME AS TACKIFIER

Vincent L. Hughes, and Ralph W. Looney, both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 511,518, Jul. 7, 1983, abandoned. This application Oct. 10, 1986, Ser. No. 918,616

Int. Cl.⁴ C08F *10/14*

U.S. Cl. 526—290 **7 Claims**

1. A fully saturated aliphatic petroleum resin possessing in its backbone structure a preponderance of substituted cyclohexane rings and having a number average molecular weight of ($\overline{Mn}$) of 400 to 800, a softening point of 40° C. to 70° C., a glass transition temperature (Tg) of less than 45° C. and, when admixed at the total weight level of 60% with a polystyrene-hydrogenated polydiene-polystyrene saturated midblock thermoplastic elastomer of $\overline{Mn}$ from about 30,000 to about 200,000 as measured by GPC, provides a HMPSA having a rolling ball tack of less than 10 cm and a Polyken probe tack greater than 400 gm/cm^2, said resin being produced by the Friedel-Crafts polymerization of a C_5-C_6 fraction from steam cracked naphtha or light refinery streams having a boiling range from 20° C. to 80° C., said resin having a major proportion of the polymerizable content comprising piperylene and 2-methyl-2-butene or similar branched olefins.

4,714,750

SYNTHESIS OF PRODUCTS FROM POLYOXYALKYLENE AMINES AND 2,6-DI-T-BUTYLPHENOL FOR USE AS EPOXY ACCELERATORS AND CURING AGENTS

Robert A. Grigsby, Jr., Georgetown, and George P. Speranza, Austin, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

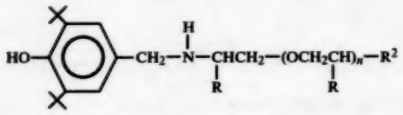
Filed Jun. 25, 1986, Ser. No. 878,456

The portion of the term of this patent subsequent to Jul. 2, 2002, has been disclaimed.

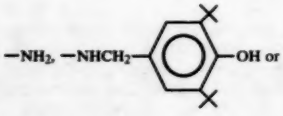
Int. Cl.[4] C08G *59/00, 59/40, 8/28, 91/16*

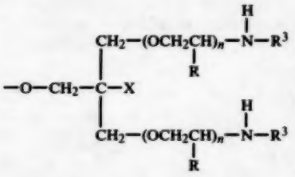
U.S. Cl. 528—99 **33 Claims**

1. A compound having the formula:

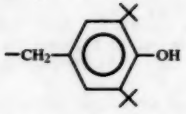


wherein (1) R represents hydrogen, $—CH_3$ or $—CH_2CH_3$; (2) n represents an integer having a value of 1 to 70, and (3) R^2 represents an alkoxy group having 1 to 20 carbon atoms,

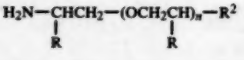




wherein R and n are defined as above, X represents hydrogen or an alkyl group containing from 1 to 3 carbon atoms, and R^3 represents hydrogen or



27. A process for preparing Mannich condensates comprising reacting 2,6-di-t-butylphenol with formaldehyde and a polyoxyalkylene amine having the formula:

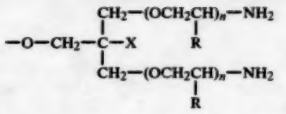


wherein

(a) R represents hydrogen, $—CH_3$ or $—CH_2CH_3$

(b) n represents an integer having a value of 1 to 70, and

(c) R^2 represents an alkoxyl group having 1 to 20 carbon atoms, $—NH_2$ or



wherein R and n are defined as above, and X represents hydrogen or an akyl group containing from 1 to 3 carbon atoms.

4,714,751

CROSSLINKABLE RESIN, PHOTOSENSITIVE RECORDING MATERIAL BASED ON THIS CROSSLINKABLE RESIN, AND PRODUCTION OF A LITHOGRAPHIC PRINTING PLATE USING THIS PHOTOSENSITIVE RECORDING MATERIAL

Gunnar Schornick, Neuleiningen; Albert Elzer, Otterstadt, and Reiner Hofmann, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 18, 1985, Ser. No. 810,191

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447355

Int. Cl.[4] C08G *59/14, 63/12;* **G03C** *1/727*

U.S. Cl. 528—103 **8 Claims**

1. A crosslinkable oligomeric resin which is soluble or dispersible in an aqueous alkaline solution, contains acryloyl and/or methacryloyl groups and free carboxyl groups and has a mean molecular weight (number average) of from about 1,000 to 10,000 and an acid number of from 50 to 150, obtained by reacting a diol or polyol compound containing one or more (meth)acryloyl groups with a polyfunctional carboxylic acid or a cyclic anhydride of a polyfunctional carboxylic acid, with formation of an acidic partial ester of the carboxylic acid, and then subjecting some of the free carboxyl groups of the resulting reaction product to a chain-extending reaction with a diepoxide and/or a polyepoxide.

4,714,752

2,2-BIS (4 HYDROXYPHENYL) ALKYL POLY DERIVATIVES FOR USE IN AFTER-TREATMENT OF CONVERSION COATED METALS

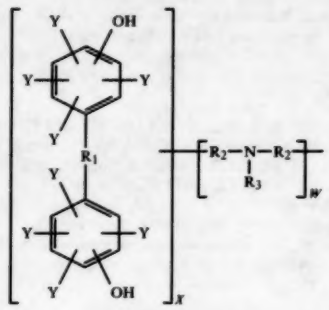
Stanley M. Sokalski, Southfield, Mich., assignor to Detrex Corporation, Southfield, Mich.

Filed Jul. 28, 1986, Ser. No. 890,916

Int. Cl.[4] C23C *22/82*

U.S. Cl. 528—153 **12 Claims**

1. An aqueous composition including polymeric water soluble or water dispersible material useful in the treatment of metals to enhance the corrosion resistance and paint adhesion characteristics thereof comprising up to about 10% by weight of a polymer which has been polymerized under basic conditions having the general formula:



wherein

W and X are each 2 or more up to a number at which the polymer is not soluble or dispersible in water; and in which

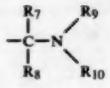
R_1 is an alkyl group having from 1 to about 5 carbon atoms;

R_2 is an alkyl group having from 1 to about 5 carbon atoms;

R_3 is an alkyl or hydroxyalkyl group having from 1 to about 5 carbon atoms;

each Y is hydrogen, Z, $CR_4R_5OR_6$, CH_2Cl, an alkyl group having from 1 to 18 carbon atoms, or an aryl group; and

wherein Z is represented by the formula



R_4 through R_{10} are hydrogen, or an alkyl, aryl, hydroxyalkyl, amino-alkyl, mercapto-alkyl, or phospho-alkyl moiety, said R_4 through R_{10} being of carbon chain lengths up to a length at which the polymer is not soluble or dispersible in water; and

X is from 2 up to a number at which the polymer is not soluble or dispersible in water.

4,714,753

THERMOPLASTIC POLYETHERIMIDE ESTER ELASTOMERS EXHIBITING IMPROVED HYDROLYTIC STABILITY

Russell J. McCready, and John A. Tyrell, both of Mt. Vernon, Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 1, 1986, Ser. No. 936,529

Int. Cl.[4] C08G *63/18*

U.S. Cl. 528—288 **35 Claims**

1. A polyetherimide ester composition exhibiting improved hydrolytic stability comprising the reaction products of:

(i) at least one diol;

(ii) at least one dicarboxylic acid or an ester forming reactive derivative thereof; and

(iii) a set of reactants selected from

(a) (i) an amount at least effective to improve the hydrolytic stability of said composition of at least one high molecular weight bisaminoalkyl polytetrahydrofuran, and (ii) at least one tricarboxylic acid or derivative thereof, or

(b) an amount at least effective to improve the hydrolytic stability of said composition of at least one polyoxytetramethylene dialkylenediimide diacid.

4,714,754

POLYETHERIMIDE ESTERS

Russell J. McCready, and John A. Tyrell, both of Mt. Vernon, Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Nov. 10, 1986, Ser. No. 929,041

Int. Cl.[4] C08G *63/44, 69/00, 69/44*

U.S. Cl. 528—288 **46 Claims**

1. A polyetherimde ester composition comprising the reaction products of:

(i) a mixture of at least one low molecular weight diol and at least one high molecular weight diol; and

(ii) a set of reactants selected from

(a) (i) at least one high molecular weight poly(oxy alkylene)diamine, and (ii) at least one tricarboxylic acid or a derivative thereof, or

(b) at least one high molecular weight polyoxyalkylene diimide diacid.

4,714,755

THERMOPLASTIC POLYETHERIMIDE ESTER ELASTOMERS EXHIBITING IMPROVED THERMAL PROPERTIES

Russell J. McCready, and John A. Tyrell, both of Mt. Vernon, Ind., assignors to General Electric Company, New York, N.Y.

Filed Sep. 30, 1986, Ser. No. 913,372

Int. Cl.[4] C08G *63/44, 69/44*

U.S. Cl. 528—288 **38 Claims**

1. A polyetherimide ester composition exhibiting improved thermal properties comprising the reaction products of:

(i) a mixture of noncyclic C_2–C_6 alkanediol and cyclohexane dimethanol, wherein said cyclohexane dimethanol is present in said mixture in an amount at least in excess of 50 mole percent;

(ii) at least one dicarboxylic acid or an ester forming reactive derivative thereof; and

(iii) a set of reactants selected from

(a) (i) at least one high molecular weight poly(oxy alkylene)diamine, and (ii) at least one tricarboxylic acid or a derivative thereof, or

(b) at least one polyoxyalkylene diimide diacid.

4,714,756

PROCESS FOR PREPARING MELT PROCESSIBLE TETRAFLUOROETHYLENE COPOLYMER GRANULES

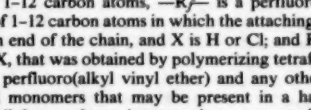
Marlin D. Buckmaster, Vienna, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 23, 1985, Ser. No. 790,493

Int. Cl.[4] C08F *6/22*

U.S. Cl. 528—481 **2 Claims**

1. A process for treating a slurry of a melt-processible, substantially nonelastomeric copolymer consisting of units of tetrafluoroethylene and perfluoro(alkyl vinyl ether) where the alkyl group is of 1–8 carbon atoms and the ether is present in amounts of between 1 and 10 weight %, which copolymer may contain from between zero to about 5% by weight of at least one additional comonomer represented by the formula:



wherein R_1 is $—R_f$ or $—R_f—X$ in which $—R_f$ is perfluoroalkyl radical of 1–12 carbon atoms, $—R_f—$ is a perfluoroalkylene diradical of 1–12 carbon atoms in which the attaching valences are at each end of the chain, and X is H or Cl; and R_2 is —Rf or $—R_f—X$, that was obtained by polymerizing tetrafluoroethylene and perfluoro(alkyl vinyl ether) and any other above-mentioned monomers that may be present in a halocarbon solvent until the copolymer is present in an amount of 5 to 15% by weight, which comprises

A. contacting the slurry with water until the slurry water

ratio is 1/10 to 2/1 by volume, while agitating the mixture and heating at 20° to 100° C.,

B. venting the halocarbon solvent while maintaining heat and agitation,

C. removing water from the water/copolymer mixture obtained in B and drying the copolymer,

D. hardening the copolymer by heating the dried copolymer at a temperature between 25° C. below the differential scanning calorimeter melt onset temperature of the copolymer and the initial melt endotherm peak temperature of the copolymer, until a requisite degree of hardening is obtained as determined by an attrition factor of less than 30 in the copolymer.

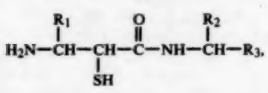
4,714,757

AMINOPEPTIDASE INHIBITORS

Eric M. Gordon, Pennington; Jollie D. Godfrey, Jr., Trenton, and Norma G. Delaney, Princeton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sep. 18, 1985, Ser. No. 777,121
Int. Cl.[4] C07K *5/506, 5/508*
U.S. Cl. 530—329 **9 Claims**

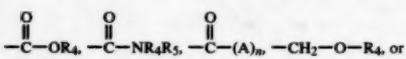
1. A compound having the formula



or a pharmaceutically acceptable salt thereof wherein

R_1 and R_2 are each independently hydrogen, alkyl, carboxyalkyl, halo-substituted alkyl, hydroxyalkyl, aminoalkyl, mercaptoalkyl, alkylthioalkyl, (cycloalkyl)alkyl, (heteroaryl)alkyl, arylalkyl, carbamoylalkyl, guanidinyl-alkyl or heteroaryl;

R_3 is hydrogen, alkyl, cycloalkyl, aryl, heteroaryl, arylalkyl, (heteroaryl)alkyl,



$-CH_2-NR_4R_5$;

R_4 and R_5 are each independently hydrogen, alkyl, cycloalkyl, aryl, heteroaryl, arylalkyl, or (heteroaryl)alkyl;

A is glycyl, alanyl, leucyl, phenylalanyl, arginyl, sarcosyl, seryl, asparagyl, lysyl, glutamyl, histidyl, tryptophyl, cysteinyl, methionyl, threonyl, tyrosyl, valyl, aspartyl, prolyl, norleucyl, or norvalyl; and

n is an integer of 1 to 6;

wherein the term "aryl" refers to phenyl or phenyl substituted with 1, 2 or 3 alkyl, alkoxy, alkylthio, hydroxy, chlorine, bromine, fluorine, amino, alkylkamino, dialkylamino, nitro or trifluoromethyl groups;

the terms "heteroary", "alkyl" and "alkoxy" refer to groups having 1 to 7 carbon atoms; and

the term "cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms.

4,714,758

SURFACTANT COMPOSED OF ACYLATED COLLAGEN OR ACYLATED GELATINE AND A PRODUCTION PROCESS THEREOF

Tetsuro Namiki, Ome; Masayasu Furuse, Sagamihara; Yoshimitsu Kuroyanagi, Hachioji, and Teruo Miyata, Tokyo, all of Japan, assignors to Koken Co., Ltd., Tokyo, Japan

Filed Mar. 28, 1986, Ser. No. 845,441
Claims priority, application Japan, Apr. 10, 1985, 60-74408
Int. Cl.[4] C08H *1/06;* **C09H** *7/00;* **B01F** *17/30*
U.S. Cl. 530—354 **11 Claims**

1. A surfactant comprising acylated collagen or acylated gelatine produced by acylating part of the side chain amino radicals of collagen or gelatine with an aliphatic monocarboxylic acid or a functional derivative thereof having 2 to 26 carbon atoms followed by subsequently acylating part or the whole of the remaining amino radicals with a dicarboxylic acid or a functional derivative thereof having 2 to 8 carbon atoms.

4,714,759

IMMUNOTOXIN THERAPY OF ALLERGY

Robert B. Whitaker, Jr., R.R. 1, Box 936, Turner, Me. 04282

Filed Dec. 2, 1985, Ser. No. 803,230
Int. Cl.[4] C07K *17/00, 15/00*
U.S. Cl. 530—391 **22 Claims**

1. A method for treating allergy comprising, introducing in vivo an immunotoxin to selectively deplete the population of cells bearing the IgE isotype.

4,714,760

CEPHALOSPORIN INTERMEDIATES

Steven P. Brundidge, Wolcott; Paul R. Brodfuehrer, Syracuse; Chet Sapino, Jr.; Kun M. Shih, both of East Syracuse, and Donald G. Walker, Liverpool, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 767,561, Aug. 20, 1985, abandoned. This application Jul. 11, 1986, Ser. No. 882,107
The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.
Int. Cl.[4] C07D *501/18*
U.S. Cl. 540—222 **1 Claim**

1. Stable, crystalline (6R,7R)-7-amino-3-(1-methyl-1-pyrrolidinio) methylceph-3-em-4-carboxylate hydroiodide which is substantially free of the Δ^2 isomer.

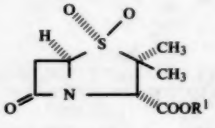
4,714,761

6,6-DIHALOPENICILLANIC ACID 1,1-DIOXIDES AND PROCESS

Ronnie D. Carroll, East Lyme, and Robert A. Volkmann, Ledyard, both of Conn., assignors to Pfizer Inc., New York, N.Y.

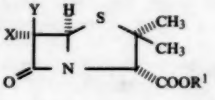
Continuation of Ser. No. 226,076, Jan. 19, 1981, abandoned, which is a continuation of Ser. No. 17,808, Mar. 5, 1979, abandoned. This application Jul. 25, 1986, Ser. No. 890,708
Int. Cl.[4] C07D *499/00;* **A61K** *31/425*
U.S. Cl. 540—310 **7 Claims**

1. A process for the preparation of a compound of the formula

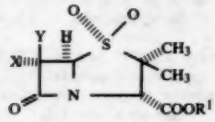


or a pharmaceutically-acceptable base salt thereof, wherein R^1 is selected from the group consisting of hydrogen alkanoyloxymethyl having from 3 to 7 carbon atoms, 1-(alkanoyloxy)-ethyl having from 4 to 8 carbon atoms, 1-methyl-1-(alkanoyloxy)ethyl having from 5 to 9 carbon atoms, alkoxycarbonyloxymethyl having from 3 to 6 carbon atoms, 1-(alkoxycarbonyloxy)ethyl having from 4 to 7 carbon atoms, 1-methyl-1-(alkoxycarbonyloxy)ethyl having from 5 to 8 carbon atoms, 3-phthalidyl, 4-crotonolactonyl and gamma-butyrolacton-4-yl, which comprises the steps of:

(a) contacting a compound of the formula



or a base salt thereof with a reagent selected from the group consisting of alkali metal permanganates, alkaline earth metal permanganates and organic peroxycarboxylic acids, to give a compound of the formula



or a base salt thereof, wherein X and Y are each selected from the group consisting of chloro, bromo and iodo; provided that X and Y are not both chloro and X and Y are not both iodo; and

(b) contacting the product of step (a) with hydrogen, in an enert solvent, at a pressure in the range from about 1 to about 100 kg/cm^2, at a temperature in the range from about 0° to about 60° C. at a pH in the range from about 4 to about 9, and in the presence of from about 0.01 to about 2.5 weight-percent of a hydrogenolysis catalyst.

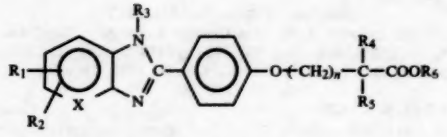
4,714,762

ANTIARTERIOSCLEROTIC SUBSTITUTED BENZIMIDAZOL-2-YL-AND 3H-IMIDAZO[4,5-b]PYRIDIN-2-YL-PHENOXY-ALKANOIC ACIDS AND SALTS AND ESTERS THEREOF

Milton L. Hoefle, Ann Arbor; Ann Holmes, Dexter, and Charlotte D. Stratton, Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 31, 1986, Ser. No. 926,021
Int. Cl.^{4} A61K *31/44*; C07D *471/04, 487/04*
U.S. Cl. 514—303 **28 Claims**

1. A compound having the structural formula



wherein X is CH or N; R_1 and R_2 are the same or different and are hydrogen, halogen, straight or branched alkyl or alkoxy of from one to six carbon atoms, or CF_3; n is an integer of from three to six; R_4 and R_5 are the same or different and are a straight or branched alkyl of from one to six carbon atoms or when R_4 and R_5 are taken together are $—(CH_2)_p$ wherein p is an integer of from two to five; R_6 is hydrogen, a straight or branched alkyl of from one to six carbon atoms, an alkali or alkaline earth metal cation, an organic amino cation, or ammonium; R_3 is hydrogen, an alkyl of from one to six carbon atoms which may be substituted by hydroxy phenyl or CO_2R_6; or a pharmaceutically acceptable acid addition salt thereof.

27. An antiarteriosclerotic pharmaceutical composition comprising an effective amount of a compound as defined in claim 1 in combination with a pharmaceutically acceptable carrier.

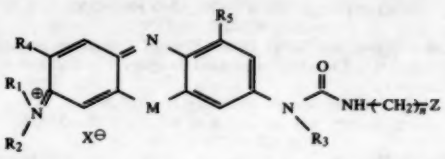
4,714,763

NOVEL OXAZINE-UREAS AND THIAZINE UREA CHROMOPHORS AS FLUORESCENT LABELS

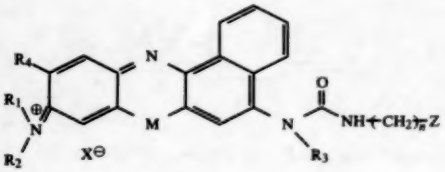
Spyros Theodoropulos, Yorktown Heights, N.Y., assignor to Viomedics Inc., Worcester, Mass.

Filed Jul. 11, 1985, Ser. No. 753,937
Int. Cl.^{4} C07D *265/38, 279/36*
U.S. Cl. 544—31 **8 Claims**

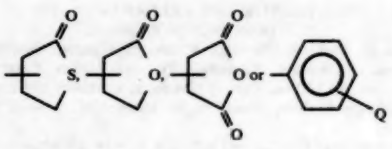
1. Urea derivatives of oxazine and thiazine chromophors selected from the group consisting of:



and



wherein n is 0 to 20; M is oxygen or sulfur; R_1 is hydrogen or alkyl group from 1 to 10 carbon atoms; R_2 is hydrogen or alkyl group from 1 to 10 carbon atoms; R_3 is hydrogen or alkyl group from 1 to 10 carbon atoms; R_4 is hydrogen, alkyl group from 1 to 10 carbon atoms, halogen or amino group; R_5 is hydrogen, alkyl group from 1 to 10 carbon atoms, halogen or amino group; $X^\ominus$ is an organic or an inorganic anion and Z is N=C=O, N=C=S, carboxylic, or amino, and when n=0, Z may be



wherein Q is isocyanato or isothiocyanato.

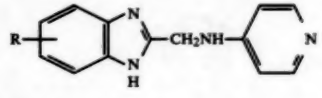
4,714,764

2-(4-PYRIDYLAMINOMETHYL)-BENZIMIDAZOLE DERIVATIVES HAVING ANTIVIRAL ACTIVITY

Nobukatsu Sato, Nara; Haruo Kuraiyama, Mukou, and Masaaobu Agou, Ikeda, all of Japan, assignors to Maruishi Seiyaku Kabushiki Kaisha, Osaka, Japan

Filed Jul. 11, 1986, Ser. No. 884,624
Claims priority, application Japan, Jul. 15, 1985, 60-156680
Int. Cl.^{4} C07D *401/02*
U.S. Cl. 546—271 **2 Claims**

1. 2-(4-pyridylaminomethyl)-benzimidazole derivatives represented by the following formula:



wherein R is a radical selected from the group consisting of hydrogen, 5(6)-chloro, 5(6)-benzoyl, 5(6)-methoxy, 5(6)-methyl, 5(6)-nitro, 5,6-dichloro, 5(6)-amino, 5(6)-trifluoromethyl, 5(6)-ethyl, 4(7)-methyl and 5,6-dimethyl groups.

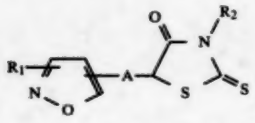
4,714,765

RHODANINE DERIVATIVES AND PROCESS FOR PREPARING THE SAME

Kazuo Ogawa, and Takaji Honna, both of Tokushima, Japan, assignors to Taiho Pharmaceutical Company, Limited, Tokyo, Japan

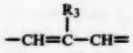
Filed Dec. 19, 1985, Ser. No. 810,594
Claims priority, application Japan, Jul. 10, 1985, 60-152632
Int. Cl.[4] C07D *417/06*
U.S. Cl. 548—183 9 Claims

1. A rhodanine derivative represented by the formula



(I)

wherein R_1 is lower alkyl, A is a group of the formula



(in which R_3 is hydrogen or lower alkyl) or methylene, and R_2 is hydrogen or a group of the formula $—(CH_2)_nCOOH$ (in which n is an integer of 1 to 6) or a salt thereof

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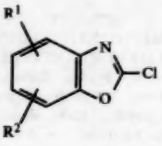
4,714,766

PROCESS FOR THE PREPARATION OF 2-CHLOROBENZOXAZOLES

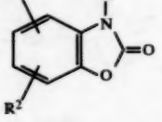
Johannes Becherer, Maintal; Reinhardt Handte, Gablingen; Hans J. Nestler, Königstein/Ts, and Ulrich Kussmaul, Karben, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 647,439, Sep. 5, 1984, abandoned. This application Jul. 14, 1986, Ser. No. 885,148
Claims priority, application Fed. Rep. of Germany, Sep. 23, 1983, 3334417
Int. Cl.[4] C07D *263/54*
U.S. Cl. 548—217 9 Claims

1. The process for the preparation of 2-chlorobenzoxazoles of the formula



wherein R^1 and R^2, independently of one another, are hydrogen or halogen, which comprises introducing a benzoxazolinone of the formula



in portions or continuously to a 120° to 200° C. hot solution of 2 to 10 moles per mole of the benzoxazolinone of phosphorus pentachloride in an enert solvent.

4,714,767

PROCESS FOR THE SEPARATION OF A BASIC AMINO ACID FROM A FERMENTATION BROTH USING CATION EXCHANGE RESINS

Kiyoshi Tanaka, Tokyo; Masaru Saeki, Saga; Tsutomu Matsuishi, Yanagawa; Yoshihiro Koga, Saga, and Tetsuya Kawakita, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Jul. 11, 1985, Ser. No. 753,881
Claims priority, application Japan, Jul. 11, 1984, 59-143802
The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.
Int. Cl.[4] C07D *233/64;* C07C *101/24*
U.S. Cl. 548—344 10 Claims

1. A process for separating basic amino acids from a liquid containing the same using a plurality of cation exchange resin towers in series, which comprises effecting repetitive adsorption and elution steps in sequence, wherein the washing water employed in said adsorption and elution steps is obtained by recycling the latter portion of a liquid discharged from a first tower of the adsorption step into an adsorption step in a subsequent cycle, or by recycling a liquid discharge from a first tower at the elution step into an elution step in a subsequent cycle.

4,714,768

N-(CHLOROCARBONYLOXY)-5-NORBORNENE-2,3-DICARBOXIMIDE, PROCESS FOR ITS PRODUCTION AND ITS USE

Peter Henklein; Manfred Becker; Werner Büttner, all of Berlin; Fritz Loth; Horts Dautzenberg, both of Teltow; Klaus Forner; Rudolf Dölling, both of Berlin; Karl-Heinz Graul, Quedlinburg; Wolf-Rainer Halatsch, Glienicke, and Christian Ruprich, Berlin, all of German Democratic Rep., assignors to Akademie Der Wissenschaften Der DDR, Berlin, German Democratic Rep.

Filed Aug. 27, 1984, Ser. No. 644,777
Claims priority, application German Democratic Rep., Aug. 25, 1983, 2541961; Aug. 25, 1983, 2541978; Aug. 25, 1983, 2541986; Oct. 28, 1983, 2560562; Oct. 28, 1983, 2560570
Int. Cl.[4] C07D *209/02*
U.S. Cl. 548—435 1 Claim

1. N-(chlorocarbonyloxy)-5-norbornene-2,3-dicarboximide I.

4,714,769

PROCESS FOR THE SYNTHESIS OF ORGANOFUNCTIONAL SILANES USING ISATOIC ANHYDRIDE OR DERIVATIVES THEREOF

Mario De Antoniis, Monterotondo; Mario Fiorini, and Giuseppina Mazzamurro, both of Rome, all of Italy, assignors to Enricerche S.p.A., Milan, Italy

Filed Jun. 24, 1986, Ser. No. 877,900
Claims priority, application Italy, Jul. 1, 1985, 21374 A/85
Int. Cl.[4] C07F *7/10;* B32B *27/36, 9/00, 17/06*
U.S. Cl. 556—419 10 Claims

1. Benzamide-2-amino-N-3-triethoxysilylpropyl.

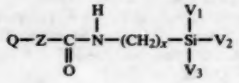
4,714,770

DYE SILANE COMPOSITIONS

Li-Chien Hsu, Mission Viejo, and Hal Heitzmann, Irvine, both of Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 5, 1987, Ser. No. 537
Int. Cl.[4] C07F *7/08, 7/10, 7/12*
U.S. Cl. 556—419 9 Claims

1. A dye containing silicon composition having the formula



wherein Q is a polynuclear aromatic hydrocarbon based fluorescent dye; "selected from the group of polynuclear aromatic dyes consisting of pyrene, perylene, benzopylene and derivatives thereof" X is an integer of from 1 ro 50. Z is a hydrocarbon of up to 50 carbon atoms; and V_1, V_2, and V_3 are independently any hydrocarbon of up to 50 carbon atoms or hydrogen, halogen, alkenyl, acyloxy, alkoxy, amine or amide, with the proviso that at least one of the V_1, V_2, or V_3 substituents be a "hydrogen, halogen, alkenyl, acyloxy, alkoxy, amine or amide." derivatives thereof.

4,714,771

PROCESS FOR PREPARING HALOGENATED TRIALKYL PHOSPHATE ESTERS

Ming-Biann Liu, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 27, 1985, Ser. No. 802,145
Int. Cl.⁴ C07F *9/09*
U.S. Cl. 558—102 **58 Claims**

37. A method of producing a halogenated trialkyl phosphate ester which comprises:

admixing a haloneopentyl alcohol containing a halogen selected from the group consisting of Br, Cl, I and mixtures thereof, a solvent suitable to dissolve the haloneopentyl alcohol and the phosphorus oxyhalide, said solvent being substantially inert to hydrogen halide, and a catalyst selected from the group consisting of Mg, $MgCl_2$, $MgSO_4$, MgCl(OH), $(C_2H_5)_3NHCl$, $AlCl_3$, $(C_2H_5)_4NCl$, $TiCl_4$, $SnCl_4$ and $ZrCl_4$;

refluxing said admixtures sufficiently to form a halogentated trialkyl phosphate ester precipitate; and

recovering said precipitate.

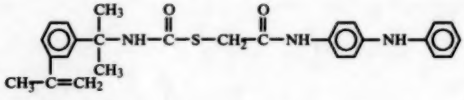
4,714,772

FUNCTIONALIZED MONOMERS FROM 1-(1-ISOCYANATO-1-METHYLETHYL)-3 OR 4-(1-METHYLETHENYL) BENZENE

Howard A. Colvin; Kirkwood S. Cottman, both of Akron, and Dane K. Parker, Massillon, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 737,742, May 28, 1985. This application Dec. 16, 1985, Ser. No. 809,688
Int. Cl.⁴ C07C *155/02*
U.S. Cl. 558—240 **2 Claims**

1. A free radical emulsion polymerizable composition of matter having the structural formula:



4,714,773

HYDROCYANATION OF BUTADIENE

Morris Rapoport, Orange, Tex., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 9, 1987, Ser. No. 5,431
Int. Cl.⁴ C07C *120/02*
U.S. Cl. 558—338 **8 Claims**

1. A continuous process for the production of 3,4-pentenenitriles which comprises reacting butadiene and hydrogen cyanide in the presence of a zerovalent nickel catalyst of formula $Ni[P(OR)_3]_4$ and excess ligand having the formula $P(OR)_3$ where 10 to 65 mol percent of the R groups are phenyl and 35 to 90 mol percent of the R groups are mixed meta- and para-tolyl, where the ratio of meta- and para-tolyl is in the range of 0.5/1 to 3.5/1, and where the feed molar $P(OR)_3/Ni(O)$ ratio is in the range from 8/1 to 30/1, and the feed molar ratio of hydrogen cyanide to butadiene is in the range of 0.5/1 to 1/1, and the reaction temperature is in the range of 25° to 200° C.

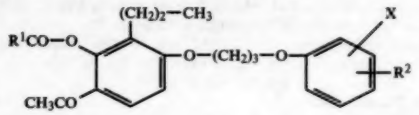
4,714,774

BENZOIC ACID DERIVATIVES AND THEIR PRODUCTION

Akira Nohara, and Yoshitaka Maki, both of Kyoto, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Oct. 25, 1985, Ser. No. 791,543
Claims priority, application PCT Int'l Appl., Oct. 30, 1984, PCT/JP84/00520; Japan, Sep. 25, 1985, 60-213578
Int. Cl.⁴ C07C *69/76*
U.S. Cl. 560—053 **11 Claims**

1. A compound of the formula:



wherein R^1 stands for a lower alkyl group, R^2 stands for an optionally protected carboxyl group and X stands for a halogen or a salt thereof.

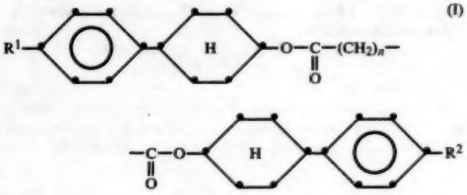
4,714,775

PHENYLCYCLOHEXYL DICARBOXYLATES

Anne-Marie Giroud, La Tronche, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 1, 1986, Ser. No. 913,938
Claims priority, application France, Oct. 2, 1985, 85 14621
Int. Cl.⁴ C07C *69/353*
U.S. Cl. 560—194 **5 Claims**

1. A compound of the formula:



(I)

in which R^1 and R^2, which can be the same or different, represent a hydrogen atom or an alkyl radical having 1 to 12 carbon atoms and n is an integer between 2 and 16.

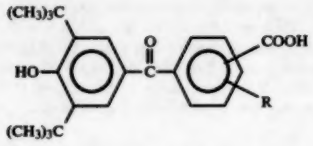
4,714,776

ANTIALLERGIC AGENTS

Randy L. Bell, North St. Paul, and George G. I. Moore, Woodbury, both of Minn., assignors to Riker Laboratories, Inc., St. Paul, Minn.

Filed Jul. 22, 1985, Ser. No. 757,686
Int. Cl.⁴ C07C *65/32, 69/76*
U.S. Cl. 562—460 **7 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, lower alkoxy or chloro; or a derivative thereof selected from a lower alkyl ester, a (lower)-alkylamino(lower)alkyl ester, a pharmaceutically acceptable (lower)alkylamino(lower)alkyl ester acid-addition salt and a pharmaceutically acceptable carboxylate salt.

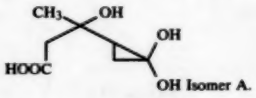
4,714,777

CYCLOPROPANONE HYDRATE DERIVATIVES

Paul Dowd, Pittsburgh; Christopher Kaufman, Dravosburg, both of Pa., and Robert H. Abeles, Newton Centre, Mass., assignors to University of Pittsburgh, Pittsburgh, Pa.

Continuation of Ser. No. 622,841, Jun. 21, 1984, abandoned.
This application Jan. 6, 1986, Ser. No. 817,762
Int. Cl.[4] C07C *61/04*
U.S. Cl. 562—506 **1 Claim**

1. A cyclopropanone hydrate derivative of the structural formula:



OH Isomer A.

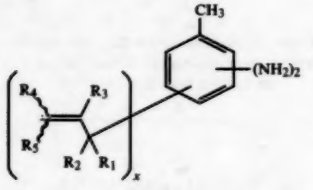
4,714,778

ALKENYLATED TOLUENEDIAMINES FOR USE IN PREPARING POLYURETHANE/UREA SYSTEMS

William F. Burgoyne, Jr., Allentown, and Dale D. Dixon, Kutztown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 7, 1986, Ser. No. 837,461
Int. Cl.[4] C07C *87/58*
U.S. Cl. 564—305 **31 Claims**

1. A toluenediamine composition having one alkenyl substituent ortho to an amine group and the amine groups are in the 2,3-, 2,4- 2,6- or 3,4-position represented by the formula:



wherein R_1, R_2, R_3, R_4 and R_5 are hydrogen, C_{1-3} aliphatic, phenyl, halogen or alkoxy radicals, or R_2 and R_4 or R_5 are bridged via an alkylene radical—$(CH_2)_y$—wherein y=2 to 5, and x is one provided that in said formula at least one of R_1, R_2, R_3, R_4 or R_5 is C_1 or greater and provided that not more than one is a phenyl, halogen or alkoxy radical.

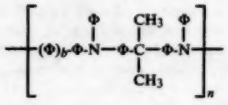
4,714,779

AROMATIC ARYL AMINE POLYMERS

S. Richard Turner, Bridgewater, N.J., and John F. Yanus, Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 20, 1980, Ser. No. 208,605
Int. Cl.[4] C07C *87/50*
U.S. Cl. 564—330 **3 Claims**

1. A polymer of the formula



wherein
Φ=phenyl or phenylene
b=0, 1, 2, or 3
n=3 or greater.

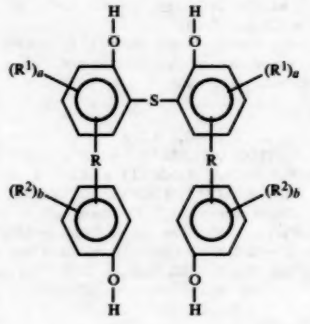
4,714,780

METHOD FOR MAKING TETRAHYDROXYDIPHENYLSULFIDE AND PRODUCT OBTAINED THEREFROM

Thomas L. Guggenheim, Glenville, N.Y., assignor to General Electric Company, Schenectady, N.Y.

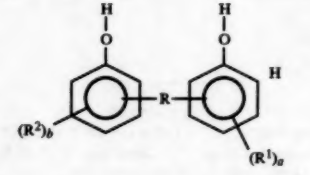
Filed Feb. 3, 1986, Ser. No. 824,915
Int. Cl.[4] C07C *149/30*
U.S. Cl. 564—430 **4 Claims**

1. A method for making a tetrahydroxydiphenylsulfide of the formula,



by

(1) effecting reaction under substantially anhydrous conditions between at least five moles of bisphenol of the formula,



per mole of sulfur dichloride, in the presence of an effective amount of a Lewis acid catalyst and an inert organic solvent, and

(2) recovering the tetrahydroxydiphenylsulfide from the mixture of (1).

where R is a $C_{(1-20)}$ divalent organo radical selected from the

group consisting of $C_{(1-8)}$ alkylene radicals, $C_{(6-13)}$ arylene radicals, or chloro, nitro, alkoxy or alkyl substituted $C_{(6-13)}$ arylene radicals, —O—, —S—,

—OR^4O—, and —SR^4S— radicals, R^1 and R^2 are members selected from the group consisting of $C_{(1-8)}$ alkyl radicals, $C_{(1-8)}$ alkoxy radicals, $C_{(6-13)}$ aryloxy radicals, and R^3S— radicals, R^3 is methyl or phenyl, R^4 is a $C_{(6-14)}$ arylene radical, a is a whole number equal to 0 to 3 inclusive and b is a whole number equal to 0 to 4 inclusive.

4. 2,2-bis[2,2-bis(4-hydroxyphenyl)propane]sulfide.

4,714,781

PROCESS FOR PRODUCING 4-RING-SUBSTITUTED PHENYL LOWER ALKYL KETONES

Balaram B. G. Gupta, North Plainfield, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Mar. 27, 1986, Ser. No. 844,641

The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

Int. Cl.[4] C07C *45/46*

U.S. Cl. 568—319 **20 Claims**

1. A process for the production of 4-lower alkyl- or 4-phenyl ring-substituted phenyl lower alkyl ketone by reaction of a lower alkyl- or phenyl-substituted benzene with a lower alkanoic acid comprising contacting a feed stream comprising said substituted benzene and acid at an elevated temperature with a medium-pore, pentasil-type molecular sieve as catalyst.

4,714,782

PROCESS FOR PREPARING OPTICALLY ACTIVE 4-HYDROXY-2-CYCLOPENTENONES

Masayoshi Minai, Moriyama, and Yuji Ueda, Izumi, both of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan

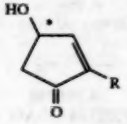
Filed Feb. 12, 1985, Ser. No. 700,890

Claims priority, application Japan, Feb. 14, 1984, 59-026647; Mar. 23, 1984, 59-056987

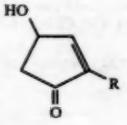
Int. Cl.[4] C07C *45/78*

U.S. Cl. 568—347 **13 Claims**

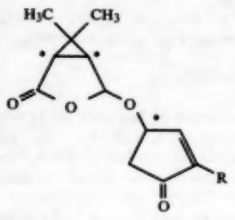
1. A process for preparing an optically active 2-substituted or unsubstituted-4-hydroxy-2-cyclopentenone of the formula:



wherein R is a hydrogen atom, an allyl group or a propargyl group, which comprises reacting the corresponding 2-substituted or unsubstituted-4-hydroxy-2-cyclopentenone of the formula:



wherein R is defined above with a lactone chosen from (1R,5S)-6,6-dimethyl-4-hydroxy-3-oxabicyclo[3.1.0]hexan-2one or (1S,5R)-6,6-dimethyl-4-hydroxy-3-oxabicyclo[3.1.0]-hexan-2-one in a molar ratio of 1.5 - 2:1 in the presence of p-toluenesulfonic acid or benzenesulfonic acid in the coexistence of an organic solvent under elimination of water as an azeotropic mixture with the organic solvent to obtain a reaction mixture comprising (1R,5S)-6,6-dimethyl-3-oxa 4(R)-[1(R)-4-oxo-2-substituted or unsubstituted-2-cyclopentenyloxy]bicyclo[3.1.0]hexan-2-one or (1S,5R)-6,6-dimethyl-3-oxa-4(S)-[1(S)-4-oxo-2-substituted or unsubstituted-2-cyclopentenyloxy]bicyclo[3.1.0]hexan-2-one of the formula:



wherein R is as defined above, wherein one of the isomers is contained in a considerably larger amount than the other isomer, separating the isomer having the larger content from the reaction mixture and hydrolyzing the separated isomer to give the optically active 2-substituted or unsubstituted-4-hydroxy-2-cyclopentenone.

4,714,783

SEPARATION OF NITROBENZALDEHYDE ISOMERS

Hermann A. Zinnen, Evanston, and Thad S. Franczyk, Skokie, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed May 12, 1986, Ser. No. 861,792

Int. Cl.[4] C07C *76/06*

U.S. Cl. 568—424 **20 Claims**

1. A process for separating the isomers of nitrobenzaldehyde from a feed mixture comprising at least two isomers of nitrobenzaldehyde, which comprises contacting said mixture at adsorption conditions with an adsorbent comprising an X-type zeolite having sodium or lithium cations at exchangeable cationic sites, a Y-type zeolite having sodium, lithium, potassium, magnesium or calcium cations at the cation exchangeable sites, or a crystalline aluminum phosphate zeolite, selectively adsorbing one of said isomers to the substantial exclusion of the other isomers, and recovering a high purity nitrobenzaldehyde as a raffinate stream.

4,714,784

METHOD FOR REMOVING N-BUTYRALDEHYDE FROM GAS STREAMS

Eckhard Moeller; Wolfgang H. E. Mueller, and Manfred Z. Hausen, all of Marl, Fed. Rep. of Germany, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jul. 16, 1986, Ser. No. 886,035

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1985, 3528124

Int. Cl.[4] C07C *45/78*

U.S. Cl. 568—492 **8 Claims**

1. A method for removing n-butyraldehyde from gas streams, comprising washing a gas stream at 0°–40° C. with a 0.5–10% by weight aqueous alkali solution in the absence of solubilizing agents.

4,714,785

METHOD FOR CONVERTING ORGANIC CHLOROFORMATE TO THE CORRESPONDING ORGANIC CHLORIDE

James A. Manner, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 15, 1986, Ser. No. 907,246
Int. Cl.[4] C07C *41/01, 19/02, 17/00*
U.S. Cl. 568—614 12 Claims

1. A method for preparing the corresponding halide of an organic haloformate of the general formula,

$$R_1(OR')_nOC(O)X$$

wherein X is chlorine or bromine, R_1 is selected from the group consisting of C_1–C_{30} alkyl, C_5–C_6 cycloalkyl, C_1–C_4 alkyl substituted C_5–C_6 cycloalkyl, phenyl, alkyl substituted phenyl of the general formula, $(R_2)_bPh$—, wherein Ph is phenylene, R_2 is C_1–C_{18} alkyl and b is an integer of from 1 to 3, phen(C_1–C_{18}) alkyl and C_1–C_{18} alkyl-substituted phen(C_1–C_{18}) alkyl having a total of from 7 to about 28 carbon atoms, R′ is the substituted ethylene group, —CH_2—$CH(R'')$—, wherein R″ is selected from hydrogen, methyl, ethyl and mixtures thereof, and n is a number from 0 to 40, provided that when R_1 is phenyl or alkyl substituted phenyl, n is at least 1, which comprises heating said haloformate for a time and at temperatures sufficient to convert the haloformate to the corresponding halide in the presence of a catalytic amount of an activated carbon catalyst.

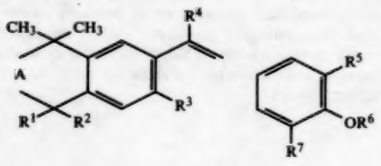
4,714,786

VINYLPHENOL DERIVATIVES, THEIR PREPARATION AND THEIR USE

Hans-Heiner Wuesi, Dossenheim; Bernd Janssen, Ludwigshafen; Fritz-Frieder Frickel, Deidesheim, and Axel Nuerrenbach, Gruenstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 28, 1987, Ser. No. 7,586
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1986, 3602473
Int. Cl.[4] C07C *43/215*
U.S. Cl. 568—633 6 Claims

1. A vinylphenol derivative of the formula I



where

A is a methylene or ethylene radical which is unsubstituted or substituted by C_1–C_4-alkyl,

R^1 and R^2 are each hydrogen or methyl,

R^3 is hydrogen, C_1–C_4-alkyl, C_1–C_4-alkoxy or halogen,

R^4 is hydrogen, C_1–C_4-alkyl, cyclopropyl or cyclobutyl,

R^5 and R^7 are each hydrogen or —OR^8, where R^8 is hydrogen, C_1–C_4-alkyl or C_1–C_4-alkanoyl, and

R^6 is hydrogen or is C_1–C_4-alkyl which is unsubstituted or substituted by carboxyl, C_1–C_4-alkoxycarbonyl, hydroxyl, C_1–C_4-alkoxy and/or amino or mono- or di-C_1–C_4-alkylamino, or is C_1–C_{20}-alkanoyl or is benzoyl which is unsubstituted or substituted as described for the C_1–C_4-alkyl group, or is aralkyl which is unsubstituted or similarly substituted in the aryl moiety, and R^6 and R^8 together may furthermore form a radical C=O, C=S, —CH_2CH_2—or CR^9R^{10}, where R^9 and R^{10} are each hydrogen, C_1–C_4-alkyl or phenyl, and its physiologically tolerated salts.

4,714,787

PRODUCTION OF ETHERS FROM LINEAR OLEFINS

Weldon K. Bell, Pennington, and Werner O. Haag, Lawrenceville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 3, 1985, Ser. No. 772,090
Int. Cl.[4] C07C *41/06*
U.S. Cl. 568—697 4 Claims

1. A process for the manufacture of methyl isopropyl ether from methanol and a C_3 hydrocarbon fraction that contains about 20 to 100 wt % of propylene, which process comprises:

preparing a mixture of said hydrocarbon fraction and 0.1 to 10 mols of methanol per mol of propylene contained in said fraction,

contacting said mixture with a solid insoluble acidic catalyst comprising materials having the structure of Zeolite Beta, said contacting being effected under a combination of conditions effective to selectively form said ether, said conditions including 1.0 to 300 atmospheres pressure, a temperature of 50° C. to about 300° C., and a WHSV of 0.5 to 50, and

recovering from said contacted mixture a fraction comprising methyl isopropyl ether.

4,714,788

TERTIARY OLEFIN PROCESS

Robert C. Michaelson, Kinnelon, N.J., and Jeffrey S. Plotkin, Monsey, N.Y., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Jul. 14, 1986, Ser. No. 885,528
Int. Cl.[4] C07C *41/06, 41/44*
U.S. Cl. 568—697 12 Claims

1. In a process for separating C_4 to C_7 tertiary mono-olefin(s) present in a C_4 to C_7 hydrocarbon mixture containing diolefins which comprises selectively reacting said tertiary mono-olefin mixture with a primary alcohol in the presence of an acid catalyst to convert the tertiary mono-olefin(s) to tertiary ether(s), separating the tertiary ether(s) from the unreacted hydrocarbon mixture to produce a tertiary ether(s) containing stream and contacting said tertiary ether(s) containing stream with a catalyst to decompose the tertiary ether(s) to tertiary olefin(s) and a primary alcohol, the improvement which comprises hydrogenating the tertiary ether(s) containing stream after that stream has been separated from the unreacted hydrocarbon mixture and prior to the decomposition step to saturate the unsaturated ether(s) formed from the diolefins present in the hydrocarbon mixture.

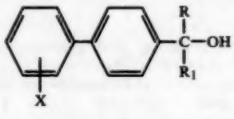
4,714,789

HALO-BIPHENYL TERTIARY ALCOHOLS USEFUL IN THERAPY IN THE TREATMENT OF ATHEROSCLEROSIS

Henri Cousse; André Delhon; Jean-Pierre Rieu, and Jean-Francois Patoiseau, all of Castres, France, assignors to P. F. Medicament, Paris, France

Filed Jul. 14, 1986, Ser. No. 884,959
Claims priority, application France, Jul. 26, 1985, 85 11582
Int. Cl.[4] C07C *33/34*
U.S. Cl. 568—807 4 Claims

1. Halo-biphenyl tertiary alcohols of general formula (I):



(I)

in which:

X represents a chlorine or bromine atom in ortho or meta position,

R and R_1 are identical or different and represent an alkyl group of low molecular weight having 1 to 4 carbon atoms, inclusive.

4,714,790

FLUORO ALCOHOLS AND INSECTICIDAL ESTERS THEREOF

Michael J. Bushell, Wokingham, England, assignor to Imperial Chemical Industries PLC, London, England

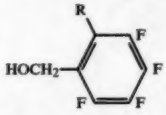
Filed Aug. 18, 1986, Ser. No. 897,345

Claims priority, application United Kingdom, Sep. 13, 1985, 8522656

Int. Cl.[4] C07B *49/00*

U.S. Cl. 568—807 1 Claim

1. A process for preparing a compound of formula:



(I)

wherein R is alkyl or alkenyl of up to 6 carbon atoms or aryl of up to 10 carbon atoms which comprises reacting pentafluorobenzyl alcohol with a Grignard reagent of formula R—Mg—X where X is halogen, wherein the Grignard reagent is added slowly to an excess of the pentafluorobenzyl alcohol and the temperature of the reaction is maintained at or below 40° C. during the addition.

4,714,791

PROCESS FOR RECOVERING PRIMARY NORMAL ALIPHATIC HIGHER ALCOHOLS

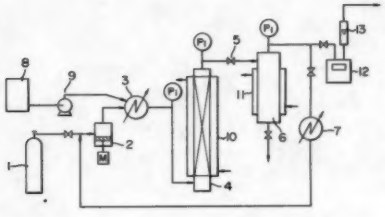
Shoshichiro Inada, Amagasaki; Kurune Furukawa, Kyoto; Takachika Masui, Hirakata; Keijiro Honda, Kagoshima; Joji Ogasawara, Kobe, and Giichi Tsubakimoto, Kakogawa, all of Japan, assignors to Seitetsu Kagaku Co., Ltd.; Shinko Seito Co., Ltd. and Shinko Sugar Production Co., Ltd., all of, Japan

Filed May 19, 1986, Ser. No. 864,246

Claims priority, application Japan, May 31, 1985, 60-119514

Int. Cl.[4] C07C *29/76, 31/125, 31/02*

U.S. Cl. 568—913 15 Claims



1. A process for recovering primary normal aliphatic higher alcohols having 20 to 36 carbon atoms, which comprises contacting sugarcanes, or products obtained from the sugarcanes, as an extraction raw material with a fluid in a subcritical or supercritical state being at least at about its critical temperature and about its critical pressure as an extractant, thereby extracting a trace amount of primary normal aliphatic higher alcohols having 20 to 36 carbon atoms contained in the extraction raw materials as an extract and separating the extracted alcohols from the extract.

4,714,792

PROCESS FOR THE PRODUCTION OF 1,2,3-TRICHLOROPROPANE

Dieter J. Müller, and Heinrich Wehmeyer, both of Marl, Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Sep. 6, 1985, Ser. No. 773,168

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1984, 3432720

Int. Cl.[4] C07C *17/06*

U.S. Cl. 570—261 20 Claims

1. A process for the production of 1,2,3-trichloropropane as predominant product comprising reacting allyl chloride with sulfuryl chloride, in the presence of a catalytically effective amount of an aliphatic amine, an aromatic amine, a phosphine or a phosphine oxide.

4,714,793

PROCESS FOR SEPARATING AN ETHYLENICALLY UNSATURATED HYDROCARBON FROM A HYDROCARBON MIXTURE

Ahazuérus T. van Eijl, Terneuzen, Netherlands, assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 524,176, Aug. 17, 1983, Pat. No. 4,596,655. This application May 2, 1986, Ser. No. 859,103

Int. Cl.[4] C07C *7/20*

U.S. Cl. 585—4 2 Claims

1. A process for inhibiting polymerization of styrene characterized by contacting a styrene containing fluid with an N-aminoalkyl piperazine.

4,714,794

SYNTHETIC OILS

Toshio Yoshida, Kawasaki, and Harumichi Watanabe, Yokohama, both of Japan, assignors to Nippon Oil Co., Ltd., Nishishimbashi, Japan

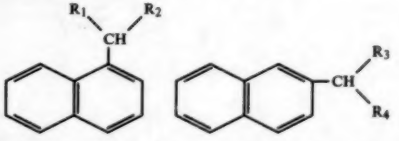
Continuation of Ser. No. 799,405, Nov. 19, 1985, abandoned. This application May 15, 1987, Ser. No. 50,760

Claims priority, application Japan, Nov. 28, 1984, 59-249771; Nov. 28, 1984, 59-249773

Int. Cl.[4] C07C *2/58, 15/24*

U.S. Cl. 585—26 12 Claims

1. A method of lubrication which consists of applying to the structure to be lubricated a synthetic oil which comprises as the active ingredient a mixture of monoalkylnaphthalenes represented by the following general formulae,



Wherein R_1, R_2, R_3 and R_4 are each a straight-chain alkyl group and the total of the carbon atoms in R_1 and R_2 or in R_3 and R_4 is 5 to 23, and the molar ratio of α-substituted monoalkylnaphthalenes to β-substituted monoalkylnaphthalenes being at least 1.0.

4,714,795

Patent Not Issued For This Number

4,714,796

PRODUCTION OF HIGHER MOLECULAR WEIGHT HYDROCARBONS FROM METHANE

Selim M. Senkan, Chicago, Ill., assignor to Illinois Institute of Technology, Chicago, Ill.

Filed Apr. 21, 1987, Ser. No. 40,853

Int. Cl.[4] C07C *1/00*

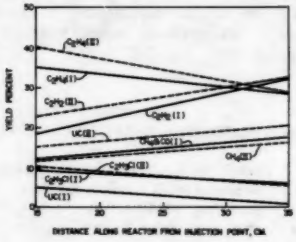
U.S. Cl. 585—328 31 Claims

1. A process for producing higher molecular weight hydro-

carbons from a gas comprising halogenated methanes, said process comprising:

oxidatively pyrolyzing said halogenated methanes under non-flame conditions in the presence of an oxygen-containing gas.

14. A process for producing higher molecular weight hydrocarbons from a gas comprising methane, said process comprising: halogenating said methane by a process of reacting said methane with a reactant selected from the group consisting of halogen containing gas and hydrogen halide, said hydrogen halide in the presence of oxygen, to form halogenated methanes and oxidatively pyrolyzing said halogentated methanes



under non-flame conditions in the presence of an oxygen-contaning gas.

4,714,797

COMPOSITE ELECTROMOTIVE APPARATUS UTILIZING SOLAR ENERGY AND THE LIKE

Toki Nagai, 9-4, Tairamachi 1-chome, Meguro-ku, Tokyo, Japan

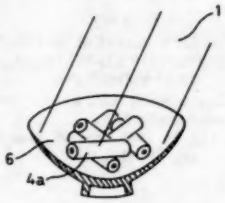
PCT No. PCT/JP83/00379, § 371 Date May 9, 1985, § 102(e) Date May 9, 1985, PCT Pub. No. WO84/02584, PCT Pub. Date Jul. 5, 1984

PCT Filed Oct. 26, 1983, Ser. No. 648,556

Claims priority, application Japan, Dec. 28, 1982, 57-229846

Int. Cl.[4] H01L *35/00*

U.S. Cl. 136—206 10 Claims



1. A composite electromotive apparatus utilizing solar energy and the like, said apparatus comprising:

at least one concave lens for use as a heat-collecting condenser;

a thermoelectromotive unit system which utilizes the Seebeck effect and the Pertier effect comprising:

thermocouple(s) (7) of which the high-temperature side(s) (*7a*) is/are positioned at the focal point (3) of the lens (2), said thermocouple acting as a thermo-acceptor and a thermoelectric motivator;

a photovoltaic unit system having a unitary photo-acceptor;

a fan means for removing heat from said photo-acceptor, said fan means rotating by itself by utilizing convection, radiation, and other phenomena; and

a magnetic electromotive/electric generator unit system (17) driven by the rotation of the said fan means.

4,714,798

TITANIUM NITRIDE ELECTRODES FOR THERMOELECTRIC GENERATORS

Robert F. Novak, Farmington Hills; Duane J. Schmatz, Dearborn Heights, and Thomas K. Hunt, Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 24, 1985, Ser. No. 813,170

Int. Cl.[4] H01L *35/14*

U.S. Cl. 136—239 17 Claims

1. An article suitable for use in thermoelectric generators, which article comprises a solid electrolyte and a film of titanium nitride adhering to the surface of said solid electrolyte, said film having a thickness less than about 10 microns.

4,714,799

OVERHEAD CONDUCTOR DAMPER WITH STAMPED AND SAND-CAST PARTS

Ronald G. Hawkins, Massena, N.Y., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 6, 1985, Ser. No. 805,819

Int. Cl.[4] H02G *7/14*

U.S. Cl. 174—42 23 Claims

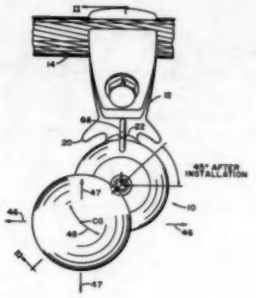
1. A device for damping vibrations of an overhead conductor comprising:

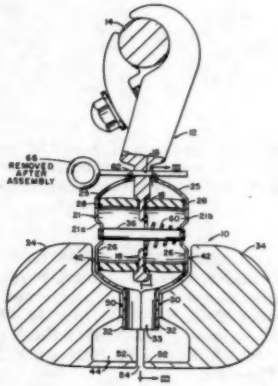
a weight member comprised of opposed weight halves each having a spherical outer surface, said weight halves being made of a relatively heavy metal material cast in a sand-casting mold,

a clamp arm,

opposed hollow elastomer damping members,

a housing structure made from stamped metal components located between the weight halves and resiliently securing said damping members between the clamp arm and opposed sides of the housing structure, and





pin means securing the weight halves and housing structure together.

4,714,800

STRESS CONTROL/INSULATING COMPOSITE ARTICLE WITH AN OUTER SURFACE HAVING CONVOLUTIONS AND ELECTRIC POWER CABLE TERMINATED THEREWITH

Alan D. Atkins; Kenneth Elliott, both of Swindon, and John S. T. Looms, East Molesey, all of Great Britain, assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 681,042, Dec. 12, 1984, abandoned.

This application Jun. 24, 1986, Ser. No. 881,504

Claims priority, application United Kingdom, Dec. 13, 1983, 8333249

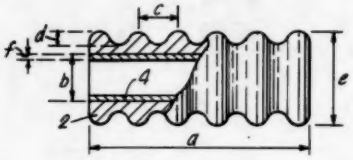
Int. Cl.[4] H02G *15/068;* H01B *17/32, 17/42, 17/64*

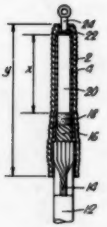
U.S. Cl. 174—73 R 17 Claims

1. A generally tubular article comprising an outer component of electrically insulating material having an outer surface extending longitudinally thereof said outer surface having along at least a part of its length a convoluted portion in the form of periodic protrusions and troughs, said protrusions having a peak-to-peak separation and a peak-to-trough height of about 15% and about 6% respectively of the outer diameter of the article; and an inner component of electrically stress grading material.

15. An electric power cable terminated by a generally tubular article comprising an outer component of electrically insulating material having an outer surface extending longitudinally thereof, said outer surface having along at least part of its

length a convoluted portion in the form of periodic protrusions and troughs, said protrusions having a peak-to-peak separation





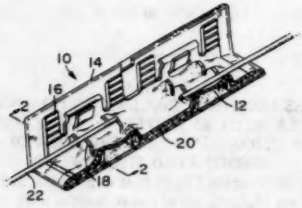
and a peak-to-trough height of about 15% and about 6% respectively of the outer diameter of the article, and an inner component of electrically stress grading material.

4,714,801

SEALANT COMPOSITION

Francis F. Koblitz, York, and Lynn K. Snyder, Spring Grove, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 620,411, Jun. 14, 1984, abandoned.
This application Aug. 20, 1985, Ser. No. 767,566
Int. Cl.[4] H01R *4/00;* **H02G** *13/06, 15/08*
U.S. Cl. 174—88 R **10 Claims**



1. An electrical connector for electrically and sealingly connecting electrical wires therein, comprising:

an electrical terminal having terminating section means in which the electrical wires can be electrically terminated when pressure is applied to terminate the wires therein;

an outer housing film along which the terminating section means extends;

sealant material in a gel condition disposed along said terminating section means, said sealant material having a viscosity in the range of 180 to 280 units of 0.1 mm each as measured by the ASTM D217 Standard Test Methods for Cone Penetration of Lubricating Grease, said sealant material comprising a homogeneous mixture of a polymeric adipate polyester having an average molecular weight in the range of 2200 to 6000 as calculated from solution viscosity measurements, and a fumed silica, the polyester forming about 80 to 85 percent by weight of the mixture while the fumed silica forms about 15 to 20 percent by weight of the mixture;

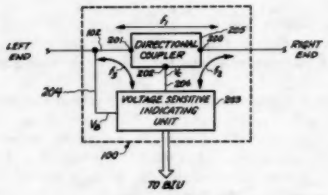
an inner film secured to said outer film and covering said sealant material, said inner film being ruptured when a terminating force is applied to said terminating section means to terminate the wires disposed therein to thereby terminate the wires therein and the sealant material being flowable under pressure created by the terminating force causing the sealant material to surround and seal the connection established between the wires and the terminating section means, the sealant material being non-migratory thereby remaining in its gel condition in the established sealing position.

4,714,802

APPARATUS AND METHOD FOR DETERMINING THE SOURCE DIRECTION OF LOCAL AREA NETWORK TRANSMISSIONS

Charles R. Stein, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 14, 1986, Ser. No. 896,499
Int. Cl.[4] H04B *3/03*
U.S. Cl. 178—1 **9 Claims**



1. A direction sensor for determining the direction from which information signals carried on a transmission medium of a communication system arrive at a node, said sensor adapted for coupling to said node and comprising:

means for providing a first output signal when an information signal is received from a first direction along said medium;

means for providing a second output signal when an information signal is received from a second direction along said medium;

first indicating means having an input coupled to receive said first output signal and responsive thereto for providing a first digital data value indicating that said information signal has been received from said first direction; and

second indicating means having an input coupled to said medium and responsive to said information signals for providing a second digital data value indicating the presence of said information signals on said medium such that the combination of said first and second digital values indicates the source direction of said information signal.

4,714,803

OVERRUNNING CLUTCH WITH SEALING MEMBER

Frederick E. Lederman, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

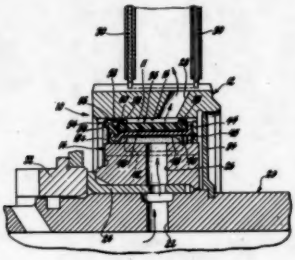
Filed Jun. 20, 1986, Ser. No. 876,771
Int. Cl.[4] F16D *15/00*
U.S. Cl. 192—41 R **3 Claims**

1. In an overrunning clutch of the type that is installable in an annular space between a pair of relatively rotatable and substantially coaxial races with a lubricant in said annular space, and in which one of said races has a cylindrical surface that moves with a running eccentricity relative to said race coaxes as said races rotate, an improved low friction means for confining said lubricant within said annular space, comprising,

a clutch cage installable to the other of said races, said cage being sized relative to said annular space so that a portion of said cage may radially float within said annular space by an amount at least equal to said running eccentricity,

a generally annular support member joined to said cage portion near one side of said annular space so as to move with said cage portion and sized so as to substantially block the flow of said lubricant through said one side of said annular space without rubbing on said cylindrical surface, and

a sealing member joined to said support member and seal-



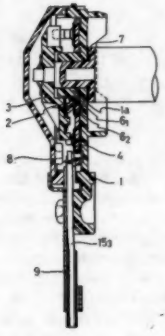
ingly engageable with said cylindrical surface so as to further block the flow of lubricant from said side of said annular space in cooperation with said support member, said sealing member, by virtue of being joined to said support member, being also radially flotable and thereby engage said eccentrically moving cylindrical surface in such a way as to prevent an increase in rubbing friction from said running eccentricity.

4,714,804

ROTARY SWITCH HAVING ROTARY CONTACTS WITH AN AMORPHOUS ALLOY COATING

Keiji Yasuda, Handa; Yukihisa Oda, Chiryu; Shigemitsu Hamajima, Oobu; Masami Ishii, Toyota; Katsumi Nakanishi, Nagoya; Takayoshi Tsuzuki, Toyota, and Jyou Tsuda, Ama, all of Japan, assignors to Aisin Seiki Kabushikikaisha, Aichi, Japan

Filed Feb. 10, 1986, Ser. No. 827,585
Claims priority, application Japan, Feb. 8, 1985, 60-023972
Int. Cl.[4] H01H *1/02, 19/08, 21/12*
U.S. Cl. 200—11 DA **5 Claims**



5. An electric contactor device comprising:

a base having an annular boss;

a rotatable shaft extending through a bore formed in the boss;

a printed circuit board fixedly mounted on the base so as to extend in a direction perpendicular to the rotatable shaft and carrying a plurality of split electrodes having their surface coated by an amorphous conductive layer and also having printed electrode leads which continue from the electrodes, said amorphous conductive layer being made of nickel-phosphorus alloy having a high phosphorus content of 21 to 25 atom percent by an electroless plating bath containing nickel ions, a reducing agent for said nickel ions, a pH buffer, a nickel ion sequestering agent, a small amount of a stress reducing agent and trisodium N-(2-hydroxyethyl)ethylenediamine-N,N',N'-triacetate as a first phosphorus deposition promoter in water;

a slider arm fixedly mounted on the rotatable shaft and disposed in opposing relationship with the printed circuit board;

a conductive slider member secured to the slider arm and disposed for engagement with the surface of the amorphous conductive layer;

a plurality of lead wires connected to the printed electrode leads;

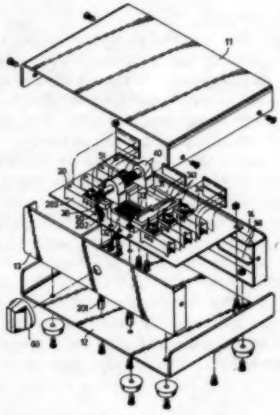
and a casing member fixedly connected to the base so as to enclose a space in which the printed circuit board and the slider arm are received.

4,714,805

SELECTIVE SWITCH

Sun C. Chen, Taipei, Taiwan, assignor to Turn-Luckily Intl., Ltd., Huntington Beach, Calif. and Hozn Auto & Soft Co., Ltd., Taipei, Taiwan

Filed Aug. 15, 1986, Ser. No. 896,718
Int. Cl.[4] H01H *15/06*
U.S. Cl. 200—16 A **5 Claims**



1. An improved selective switch comprising:

a printed circuit board, including a circuit and including at least two sets of spaced-apart contacts;

a rotating shaft, including a pinion fixed thereon;

two bearings, journalling said rotating shaft proximate to said printed circuit board; and

a first sliding member movable in a first direction, slidably mounted on said printed circuit board, including at least two sets of at least two spaced-apart conductive portions fixed thereon, each of said at least two conductive portions of each of said sets being spaced relative to one another in a second direction, said second direction being generally perpendicular to said first direction, and a rack fixed thereon and meshed with said pinion of said rotating shaft for driving said at least two sets of conductive portions of said first sliding member in said first direction so as to slide between said at least two sets of spaced-apart contacts on said printed circuit board for alternative connection and disconnection with respective ones of said at least two sets of spaced-apart contacts;

whereby when said rotating shaft is rotated, by means of the linking-up motion of said pinion and said rack, said first sliding member will be driven to slide on said printed

circuit board so that the selective control of said selective switch is achieved.

4,714,806

STEERING WHEEL WITH TAPE SWITCH ASSEMBLY

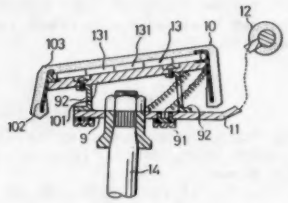
Shuji Inui, Nagoya, and Yoshio Sano, Inazawa, both of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Continuation of Ser. No. 697,448, Feb. 1, 1985, abandoned. This application Nov. 5, 1986, Ser. No. 928,646

Claims priority, application Japan, Feb. 10, 1984, 59-018554[U]

Int. Cl.[4] H01H *9/02*

U.S. Cl. 200—61.55 **3 Claims**



1. A steering wheel structure having a pad portion comprising:

a hard base plate;

a plate switch disposed on and overlying substantially the entire area of said plate and comprising a plurality of tape-shaped switches arranged closely adjacent side-by-side, each of said tape-shaped switches being generally in the shape of an elongated tape, of greater length than width, and comprising a pair of opposed electrodes each of T-shaped section extending the full length of the tape and sandwiched between insulating elastic tape-like backing strips and means for maintaining said electrodes normally spaced apart but capable of being urged into contact at any portion along the length thereof by localized pressure on a backing strip, said means including an elastic spacer between said electrodes of each pair; and

a soft covering member disposed over and covering said plate switch, whereby said plate switch extends over a large area of said pad portion and is operable by a push on substantially any portion of said pad portion area.

4,714,807

LOW VOLTAGE VACUUM CIRCUIT INTERRUPTER

Edward K. Howell, Simsbury, Conn., assignor to General Electric Company, New York, N.Y.

Division of Ser. No. 770,931, Aug. 30, 1985, Pat. No. 4,667,071. This application Mar. 2, 1987, Ser. No. 21,364

Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B **7 Claims**

1. A vacuum circuit interrupter comprising:

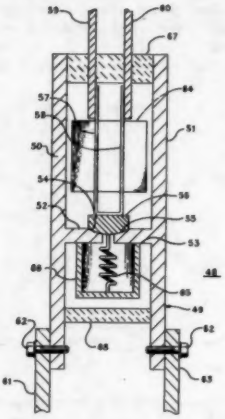
a hermetically sealed closure;

a contact structure within said closure for interrupting current through an external electric circuit;

said contact structure comprising a pair of first and second metal supports, said first support having a first shaped extension in spaced relation to a second shaped extension on said second support, said first and second shaped extensions comprising fixed contacts arranged for electrical connection with a movable bridging contact; and

contact separation means within said closure and attached to said bridging contact at one end for driving said bridging contact out of electrical connection with said fixed contacts when an electrical control signal is applied to said separating means;

said contact separation means comprising a pair of spaced parallel wires arranged between a plurality of metal plates for becoming electrodynamically repulsed by said electrical signal



to thereby lift said bridging electric contact out of electrical connection with said fixed contact pair.

4,714,808

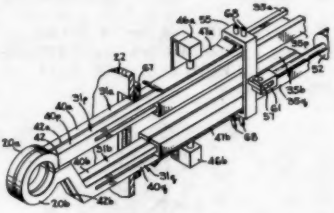
INDUCTION HEATING PRESSURE WELDING WITH LINEAR BUS BAR JOINT

Charles A. Brolin, Cedar Rapids, Iowa, assignor to FMC Corporation, Chicago, Ill.

Filed Sep. 2, 1986, Ser. No. 902,858

Int. Cl.[4] B23K *13/00*

U.S. Cl. 219—9.5 **7 Claims**



1. An induction heating pressure welding apparatus comprising an induction coil, means for clamping two articles to be welded along interfacing portions to the apparatus at a predetermined spaced apart distance between the interfacing portions for providing clearance for receiving the insertion of the coil therebetween, means for moving the coil for inserting and removing the coil between the interfacing portions of two articles, an induction power supply, means for carrying an electric current from the power supply to the coil, and means for moving at least one of the clamping means toward the other clamping means for pressure welding the heated interfacing portions of the articles together, the coil moving means and the current carrying means comprising:

first and second sets of elongated bus bars, each set having a first bus bar with one end connected to the power supply and an opposite end extending toward the coil and having a channel extending from end to end, and a second bus bar with a longitudinally extending flanged portion of a shape matching the channel in the first bus bar, the flanged portion slidably mounted in the channel of the first bus bar, one end of the second bus bar connected to the coil,

the other end slidably connected to the power supply, and means for insulating the two sets from one another for completing an electrical circuit between the power supply and the coil; and

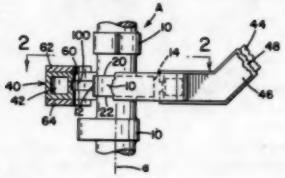
means for moving the second bus bar of each set in unison longitudinally with respect to the first bus bar of each set for inserting and removing the coil between the interfacing sections of the two articles.

4,714,809

METHOD AND APPARATUS FOR SHAPING THE SURFACES OF CAMS ON A CAMSHAFT

Michael R. Hammond, Clawson, and Donald E. Novorsky, Pleasant Ridge, both of Mich., assignors to Tocco, Inc., Boaz, Ala.

Filed Aug. 15, 1986, Ser. No. 896,965
Int. Cl.[4] H05B 6/40
U.S. Cl. 219—10.43 **30 Claims**



1. As method for controlling the shape of a generally linear elongated steel surface formed in a work piece of hardenable steel, said steel surface extending between and contiguous with edge surface defining the ends of said steel surface, each edge surface having a predetermined, peripheral configuration, said method comprising:

(a) providing an inductor having a generally linearly elongated continuous heating surface configured generally similar to said steel surface and generally parallel therewith;

(b) providing at least one elongated uniformly cross-sectioned groove in said inductor heating surface and extending in a preselected linear location with respect to said inductor heating surface;

(c) positioning said work piece with said steel surface facing said heating surface with an air gap between said heating and steel surfaces with said groove facing a selected band of said work piece steel surface;

(d) energizing said inductor with a current having frequency of less than about 50 KHz for a time less than about 3.0 seconds with a power density of about 20-70 KW/in^2 at said steel surface whereby said steel surface is raised to a temperature above the hardening temperature of said steel at a rate which is different for said selected band of said steel surface than that for the remainder of said steel surface; and,

(e) immediately quench hardening said steel surface with a liquid quenching substance whereby the shape of said steel surface is controlled.

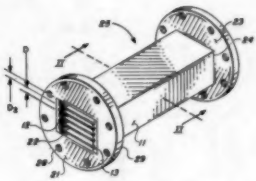
4,714,810

MEANS AND METHODS FOR HEATING SEMICONDUCTOR RIBBONS AND WAFERS WITH MICROWVAES

Murray D. Sirkis, Tempe, Ariz., assignor to Arizona Board of Regents, Tempe, Ariz.

Filed Jul. 28, 1986, Ser. No. 890,406
Int. Cl.[4] H05B 6/70
U.S. Cl. 219—10.55 M **19 Claims**

1. A waveguide holder for positioning thin semiconductor materials within a microwave field for heating thereby said holder comprising: an elongated hollow housing having a four walled rectangular cross section and a first and a second open end; a first and second shelf-like member, each mounted adjacent to a different one of said walled housing in spaced facing relationship to each other, each of said shelf-like members having a plurality of support surfaces disposed on the inner



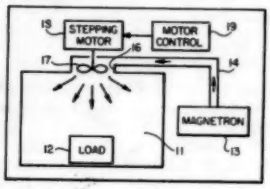
surface thereof in spaced substantially parallel relationship to each other, each said surface coacting with the corresponding one of said support surfaces on said other shelf-like member suspend one of a plurality of thin sheets of semiconductor material therebetween transversely of said housing, said sheets being disposed in spaced parallel relationship to each other.

4,714,811

MICROWAVE OVEN AND METHOD WITH CONTROLLED HEATING PROFILE

John E. Gerling, Modesto, Calif., and Ji T. Ren, Chengdu, China, assignors to Jova Enterprises, Inc., Modesto, Calif.

Filed Jul. 18, 1986, Ser. No. 888,024
Int. Cl.[4] H05B 6/74
U.S. Cl. 219—10.55 F **20 Claims**



1. In a microwave oven: a cavity for receiving a load to be heated, means for introducing microwave energy into the cavity to heat the load, a rotator for effecting relative rotation between the load and the mode patterns of the microwave energy within the oven cavity, a stepping motor connected to the rotator for moving the rotator in discrete steps between a plurality of angular positions, and preprogrammable means for applying a series of control signals of individually programmed timing to the stepping motor to control the amount of time the rotator remains in each of its angular positions and thereby provide a predetermined pattern of heating in the load.

4,714,812

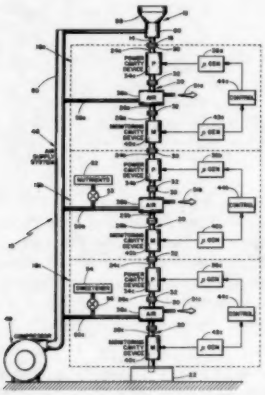
APPARATUS AND METHOD FOR PROCESSING DIELECTRIC MATERIALS WITH MICROWAVE ENERGY

Duane B. Haagensen, Edina; Darcy C. Moses, Rush City, and Leonard S. Smith, Minneapolis, all of Minn., assignors to John F. Woodhead, III, Deep Haven, Minn.

Filed May 8, 1985, Ser. No. 731,981
Int. Cl.[4] H05B 6/70
U.S. Cl. 219—10.55 A **43 Claims**

1. Microwave apparatus comprising a plurality of vertically oriented and tandemly arranged cavity devices, means for individually tuning each of said cavity devices, dielectric conduit means extending through each of said cavity devices,

respective means for supplying microwave power to each of said cavity devices, respective means for varying the amount of microwave power supplied to each of said cavity devices and including means for determining the amount of power being supplied to each of said cavity devices, respective means for determining the amount of power reflected from each of



said cavity devices, and respective monitoring means for each of said cavity devices for determining an electrical characteristic of a material passing through said dielectric conduit means, each of said monitoring means constituting a tunable cavity device including a shiftable piston, said dielectric conduit means also extending through the piston of each of said monitoring cavity devices.

4,714,813

MIXER FOR USE WITH MICROWAVE OVEN

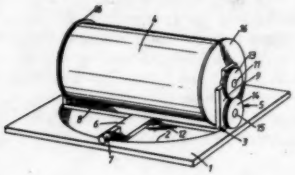
Paul M. Trenchard, 39 Penylan Road, Cardiff, CF2 5HZ, United Kingdom

PCT No. PCT/GB85/00226, § 371 Date Jan. 10, 1986, § 102(e) Date Jan. 10, 1986, PCT Pub. No. WO85/05560, PCT Filed May 28, 1985, Ser. No. 823,870

Claims priority, application United Kingdom, May 29, 1984, 8413558; Oct. 5, 1984, 8425174

Int. Cl.[4] H05B *6/78*

U.S. Cl. 219—10.55 F **11 Claims**



1. A mixer for use with a microwave oven, said mixer comprising an openable and closable, generally cylindrical drum and a cradle, said drum being journalled in said cradle, said cradle having means for engaging a turnatable drive spindle of a microwave oven to rotate therewith and to permit rotation of said drum with said drive spindle about an axis extending transversely through said drum as said drive spindle rotates said cradle, roller means carried on said cradle to rest on and to roll in a circular path on a stationary, flat surface as said drum and cradle are rotated by said drive spindle, and transmission means including at least some of said roller means for causing said drum to rotate about its own longitudinal axis as it rotates with said drive spindle.

4,714,814

WELDING MACHINE FOR WELDING TONGUES ONTO SHEET-METAL MEMBERS

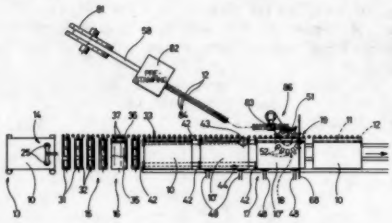
Felix Kramer, Friedlisberg, Switzerland, assignor to Elpatronic AG, Switzerland

Filed Oct. 28, 1986, Ser. No. 924,065

Claims priority, application Switzerland, Oct. 30, 1985, 4672/85

Int. Cl.[4] B23K *9/12, 11/00;* **B21D** *51/44*

U.S. Cl. 219—79 **6 Claims**



1. A welding machine for welding a tongue **(12)** onto a sheet metal member **(10)**, comprising:

a welding station;

a sheet metal conveyor **(15)** for rhythmically moving the sheet metal member through said welding station one behind the other;

a positioning device **(17)** for locating the sheet metal member at a welding position in said welding station;

a pre-stamping device for sequentially impressing in a sheet metal strip spaced tongues and corresponding markings at fixed distances from the tongues;

a drive means receiving said pre-stamped sheet metal strip for advancing said pre-stamped sheet metal strip by engaging said markings;

a punch means receiving from said drive means said pre-stamped sheet metal strip such that a foremost one of said markings which corresponds to a foremost one of said tongues engages a centering device, said punch means detaching said centered foremost tongue from said sheet metal strip at a punch position;

a tongue conveyor means including at least one tongue receiver adapted to receive and fixedly hold a punch tongue, said tongue conveyor means for locating said tongue receiver first at a punch position in registration with said punch means centering device and subsequently at said welding position in registration with a corresponding one of said sheet metal members, said welding position being separated from said punch position.

4,714,815

DUAL LASER BEAM BRAZING OF FINE WIRES

Richard E. Swarts, Simsbury; E. Marston Moffatt, Glastonbury, and Mario T. Lopiccolo, Southington, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 4, 1986, Ser. No. 926,933

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121 LC **11 Claims**

1. The method of bonding a wire having upper and lower surfaces and having a first diameter value, in lap relationship to a mounting surface having a second diameter value larger than the first diameter value, comprising the steps of:

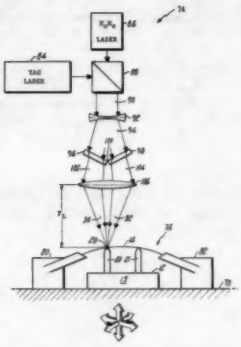
selecting the wire from a first metal and selecting the mounting surface from a second metal;

positioning the lower surface of the wire in a contact area of the mounting surface;

applying first and second high energy beams simultaneously to first and second target areas located on the mounting surface on opposite sides of, and separate from, said contact area, said first and second beams each having

beam spot diameters less than the second diameter at the point of incidence of said beams to said first and second target areas;

maintaining said high energy beams incident to said first and



second target areas for a time necessary to melt the second metal of said contact area sufficient to wet the first metal of the wire therewith to form a metallurgical bond therebetween; and

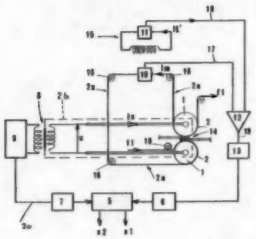
removing said beams simultaneously from said target areas.

4,714,816

MONITORING FACILITY FOR ELECTRIC WELDING EQUIPMENT, IN PARTICULAR AS USED FOR METAL BOX MANUFACTURE

Luigi Pazzaglia, Bologna, Italy, assignor to Cefin S.p.A., Bologna, Italy

Filed Jun. 15, 1987, Ser. No. 62,205
Int. Cl.[4] B23K *11/24*
U.S. Cl. 219—109 **7 Claims**



1. Monitoring facility for electric welding equipment, in particular as used for metal box manufacture, comprising:

welding rollers that operate in conjuction with a continuous electrode wire looped around guide rollers, fed at a rate matching the surface speed of the welding rollers, and creating an external circuit in parallel to the weldment located between the rollers, which is in receipt of a welding current deriving from the pulsed output voltage supplied by a converter and flowing substantially constant, at least within each half-period;

a first transducer applied to the circuit created by the electrode wire, serving to measure current flowing in the electrode circuit, which consists in an active component directly proportional to resistance at the weldment and a reactive component deriving from the magnetic field generated by the welding current, and to supply an output signal proportional to the electrode current measured;

a second transducer applied to a separate and exclusively inductive circuit within the magnetic field generated by the welding current, serving to measure the current flowing in the inductive circuit, which is proportional to the inductive component of the current measured by the first transducer, and to supply an output signal proportional to the current measured;

a filter circuit into which the first and the second transducer are cascaded, serving to eliminate the inductive component from the current measured by the first transducer, by subtracting from it the value of the inductive current measured by the second transducer, and to supply an output signal directly proportional to welding resistance;

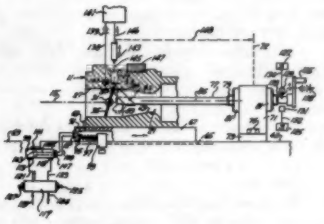
means by which to verify quality of the single weldments, hence of the entire metal box, and enable subsequent rejection of sub-standard items, incorporating a microprocessor, to which the output signal from the filter circuit is supplied in digital form, that is in possession at least of the maximum and minimum parametric limits within which the filtered output signal must fall to ensure acceptable quality of the weld, and supplies a first output signal reflecting a sub-standard weld only when the signal received from the filter circuit fails to register within the prescribed parametric limits.

4,714,817

METHOD AND APPARATUS FOR LOCATING AND MACHINING AN IDLE BYPASS HOLE IN A CARBURETOR BODY

Albert Bolden, Harper Woods, Mich., assignor to USEC, Inc., Grosse Pointe Woods, Mich.

Filed Oct. 6, 1986, Ser. No. 916,025
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121 LK **24 Claims**



1. The method of locating and cutting an idle bypass hole in a carburetor body having a venturi section and a throttle section on a longitudinal axis and a normally closed pivotal throttle plate within the throttle section, comprising:

adjustably mounting a carrier upon a fixture base for guided longitudinal movements thereon;

locating and clamping a carburetor body upon the carrier with its axis parallel to the direction of movement of the carrier;

mounting a stationary contact finger upon said base extending toward said carrier;

advancing said carburetor body with said venturi section and throttle section progressively receiving said contact finger until said contact finger is in firm engagement with said throttle plate adjacent its periphery;

clamping the carrier upon the base;

fixedly mounting a power laser cutting unit having a bushing and a focused laser beam on a cutting axis at right angles to said longitudinal axis and at a predetermined center distance to a fixed axis of reference parallel to the cutting axis relative to the mounting of said contact finger;

said cutting axis being arranged at a preset critical distance from the closed throttle plate where it engages the throttle section; and

successively cutting an idle bypass hole through said carburetor body into said throttle section upstream of said throttle plate.

4,714,818

MAGNETIC CONTROL DEVICE FOR ARC WELDING

Karel Mazac, Friedberg, Fed. Rep. of Germany, assignor to Kuka Schweissanlagen and Roboter GmbH, Augsburg, Fed. Rep. of Germany

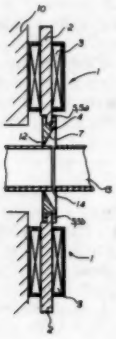
PCT No. PCT/EP85/00506, § 371 Date Jul. 10, 1986, § 102(e) Date Jul. 10, 1986, PCT Pub. No. WO86/02028, PCT Pub. Date Apr. 10, 1986

PCT Filed Oct. 1, 1985, Ser. No. 876,887

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436633

Int. Cl.[4] B23K *9/08*

U.S. Cl. 219—123 **6 Claims**



1. A device for the electric arc welding of two annular workpieces along an endless annular weld seam path lying in a plane, said device comprising:

at least two radially extending flat unipolar magnet cores lying generally in said plane of said path and surrounding said seam path with narrow pole faces of said cores;

a respective coil on each of said cores;

a protection ring in addition to said cores subdivided into individual segments each of which is attached to a respective pole face of a respective one of said cores, each segment of said protection ring having a segment of a frustoconical inner surface of said ring surrounding said weld seam path so that an axis of said frustoconical inner surface and an axis of said workpieces to be welded coincide, said inner surface of said protection ring including an angle with said axes of at least 50°, the thickness of said segments of said ring being greater than the width of said pole faces where said segments of said ring are attached to the cores; and

fastening means passing through said segments of said ring and the respective cores for fastening each of said segments of said ring to the respective core.

4,714,819

DIRECTLY HEATING FIXING APPARATUS HAVING CURRENT COLLECTING BEARINGS

Keitaro Yamashita, Saitama, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

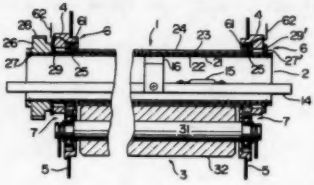
Filed Jul. 14, 1986, Ser. No. 884,956

Claims priority, application Japan, Jul. 17, 1985, 60-157643; Jul. 17, 1985, 60-157644; Jul. 17, 1985, 60-157645

Int. Cl.[4] H05B *3/00*

U.S. Cl. 219—216 **9 Claims**

1. A directly heating-type fixing apparatus having a heating roll which includes a heat generating electric resistance layer and a covering layer of a heat resistant toner releasing material, both layers being formed on a surface of a cylindrical body, and a pressure roll which is arranged to contact said heating roll under pressure, the apparatus further comprising a pair of current collecting bearings each made of an electrically conductive material provided at ends of said heating roll, respectively, said current collecting bearings supporting said heating roll against contact by said pressure roll, and said current



collecting bearings and the heat generating electric resistance layer of said heating roll being electrically connected with each other.

4,714,820

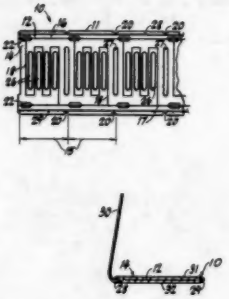
ELECTRICALLY HEATED CURLING WRAPPER

Herbert M. Morrison, Trumbull, Conn., and Jorge Del Mar, Hobe Sound, Fla., assignors to Clairol Incorporated, New York, N.Y.

Filed Aug. 22, 1985, Ser. No. 768,264

Int. Cl.[4] H05B *3/54*; A45D *2/36*; H01C *3/06*

U.S. Cl. 219—222 **2 Claims**



1. An electrically heateable hair wrapper comprising:

a flat, elongated base;

a plurality of parallel resistance heating circuits longitudinally extending along and secured to said base, said parallel resistance heating circuits being arranged in periodic serpentine patterns, the two ends of each pattern transversely of the length of said base respectively connected to parallel continuous buses adjacent the longitudinal edges of said base, said buses periodically provided along their length with areas for receiving connecting means to connect at least one of said circuits to a source of electrical power;

at least one indicator means on said base for indicating where said base and buses may be transversely cut while preserving the continuity of a selected one or ones of said parallel resistance heating circuits; and

a bendable shape-retaining cuttable wire secured to each longitudinal edge of said base outwardly of said parallel conducting buses.

4,714,821

HEAT ACCUMULATOR

Leif Jakobsson, Vindön 8736, Henån, Sweden (440 90)

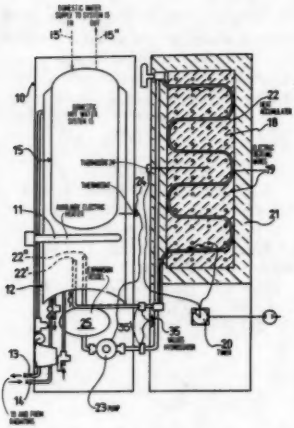
PCT No. PCT/SE83/00366, § 371 Date Jun. 27, 1984, § 102(e) Date Jun. 27, 1984, PCT Pub. No. WO84/01814, PCT Pub. Date May 10, 1984

PCT Filed Oct. 26, 1983, Ser. No. 626,858

Claims priority, application Sweden, Oct. 26, 1982, 8206155; Nov. 11, 1982, 8206403; Nov. 11, 1982, 8206404; May 6, 1983, 8302610

Int. Cl.[4] H05B *1/02;* F24H *7/02;* F24D *11/00*

U.S. Cl. 219—326 7 Claims



1. A heating system comprising a heat accumulator arranged in heat exchange relation with a heating boiler containing a fluid having a relatively low boiling point to be heated for use, said heat accumulator comprising a body of a material having a high heat capacity and a high melting point which is arranged for being heated by electric energy to a temperature considerably higher than the maximum temperature of said boiler, and an electric heating means for heating said body; said body including a conduit containing a fluid in a liquid phase having a relatively low boiling point; the fluid in said conduit being arranged in heat transferring communication with the fluid in said boiler for heating said boiler fluid; and a circulation pump having the suction side thereof in communication with an expansion vessel and said boiler, said expansion vessel being vented to the atmosphere; means responsive to the temperature of the fluid in said boiler for controlling the starting and stopping of said pump; said conduit having a predetermined volume which is relatively small as compared to the capacity of said pump; said pump having a relatively high initial startup speed to initially drive any vaporized fluid out of said conduit, and being designed and arranged to return to a relatively lower, second speed for normal operation after said initial startup; and said pump being stopped if a predetermined temperature is reached in said boiler thereby creating in said conduit of said body of said heat accumulator dry vaporized fluid of moderate pressure as established by said expansion vessel.

4,714,822

COOKER WITH MEANS FOR AUTOMATICALLY CONTROLLING THE HEATING OF A PAN WITH FOOD MATERIAL

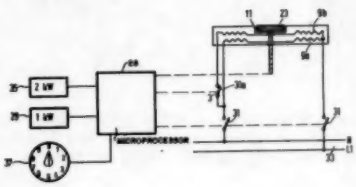
Walter Braun, Alsdorf; Reinhard Kersten, and Egbert Kuhl, both of Aachen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 31, 1986, Ser. No. 846,672

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1985, 3512545; Aug. 26, 1985, 3530403

Int. Cl.[4] H05B *3/68*

U.S. Cl. 219—449 8 Claims



1. A method for automatically controlling heating of a pan with food material in order to avoid boiling over at an end of a heating process, whereby during the heating process rise in temperature of a base of the pan is continuously determined as a function of time by means of a temperature sensor, comprising:

setting at a beginning of the heating process power supplied to an electric hotplate to a constant value;

continuously monitoring with a microprocessor in equal time intervals the temperature of the base of the pan and determining rise in the temperature of the pan base as a function of time;

comparing the actual value of the rise in the temperature of the pan base at a pan-base temperature above about 70° C. with a desired value, and when deviations occur, changing the heating power to achieve an actual value of the rise in temperature equal to the desired value; and

switching the heating power off at a pan-base temperature above 90° C. when a bending point in the temperature rise of the pan base is determined.

4,714,823

ATTENUATOR FOR EXTRANEOUS LIGHT FLUCTUATIONS IN A MICROSCOPE WITH AUTOMATIC BRIGHTNESS CONTROL

Bernd Spruck, Heubach-Lautern, and Siegfried Gerber, deceased, late of Oberkochen, both of Fed. Rep. of Germany (by Hannelore Gerber, Silvia Gerber, Eberhard Gerber, Bernhard Gerber, legal representatives), assignors to Carl-Zeiss-Stiftung, Oberkochen, Fed. Rep. of Germany

Filed Mar. 31, 1986, Ser. No. 845,964

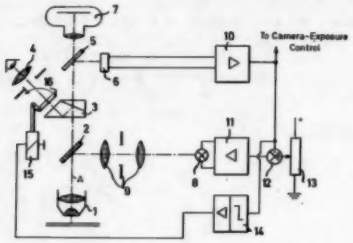
Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513146; Oct. 7, 1985, 3535749

Int. Cl.[4] G01J *1/32*

U.S. Cl. 250—205 6 Claims

1. In a microscope having an objective and an eyepiece disposed in a path of a viewing ray, a light source for object illumination, a photoreceiver coupler to said viewing ray path for providing an output signal as a function of the intensity of light transversing said path, first control means coupled to said photoreceiver and to said light source for automatically maintaining a preselected level of intensity of said light source, means for selectably including in said ray path any of a plurality of available optical elements, and second control means for decreasing said light along said path during the operation of changing said included optical element, said second control means comprising: first and second threshold means coupled to said photoreceiver for providing, respectively, a first and second threshold output signal, said threshold output signals

being provided by said first and second threshold means, respectively, whenever a differentiated signal from said photoreceiver rises above one predetermined level or falls below



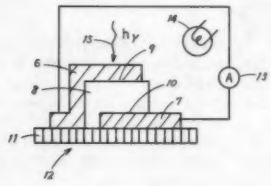
another predetermined level lower than said one predetermined level, and means responsive to said threshold output signals for reducing said light source intensity.

4,714,824

PHOTOELECTRIC TRANSDUCER WITH ADJUSTABLE SENSITIVITY TO INCIDENT LIGHT WAVELENGTH

Shinichi Terazono, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 7, 1986, Ser. No. 848,564
Claims priority, application Japan, Apr. 16, 1985, 60-83018
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—211 R **20 Claims**



1. A photoelectric tranducer, comprising:

at least one photosensitive element, said photosensitive element including first and second electrodes provided spaced apart from each other, at least one of said first and second electrodes being transparent to transmit incident light, said element further including an amorphous semiconductor provided between and in contact with said first and second electrodes for performing photoelectric conversion upon receipt of said incident light; and,

an auxiliary light source provided by a side of said transparent electrode for irradiating said photosensitive element.

4,714,825

SYSTEM FOR CALIBRATING THE TIME AXIS OF AN X-RAY STREAK TUBE

Koichiro Oba, Hamamatsu, Japan, assignor to Hamamatsu Photonics Kabushiki Kaisha, Hamamatsu, Japan

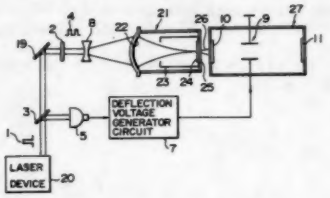
Filed Dec. 4, 1985, Ser. No. 805,425
Claims priority, application Japan, Dec. 11, 1984, 59-261438
Int. Cl.[4] G01D *18/00*
U.S. Cl. 250—213 VT **3 Claims**

1. A system for calibrating the time axis of an X-ray streak tube, said streak tube including a first photocathode, deflection means and a phosphor surface, comprising:

a light source for generating a train of light pulses, said light pulses being spaced by a predetermined interval of time;

X-ray tube means including a second photocathode, focusing means and an X-ray target, said X-ray tube means generating a train of X-rays when said second photocathode is exposed to said light pulses;

means for exposing said first photocathode of said streak tube to said train of X-rays, said first photocathode emitting an electron beam in response thereto;



means for energizing the deflection means of said streak tube, the energizing of said deflection means being synchronized with said train of light pulses; and

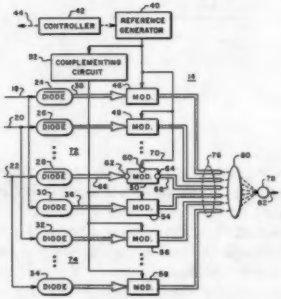
means for measuring the time interval of the streak image generated by said electron means on the phosphor surface of said X-ray streak tube.

4,714,826

APPARATUS AND METHOD FOR TESTING OUTPUTS OF LOGIC CIRCUITS BY MODULATING OPTICAL SEQUALS

Anastasios P. Goutzoulis, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 18, 1986, Ser. No. 897,673
Int. Cl.[4] G01R *19/14*
U.S. Cl. 250—213 A **23 Claims**



1. An optical system for testing high-speed logic devices producing high and low logic level signals at a plurality of output terminals, said system comprising:

first means for producing a first plurality of optical signals corresponding to products of actual output logic signals from a logic device and complements of desired logic signals, said plurality of optical signals including light only when said actual output logic signals and said complements of said desired logic signals are both at high logic levels;

second means for producing a second plurality of optical signals corresponding to products of complements of said actual output logic signals from said logic device and said desired logic signals, said second plurality of optical signals including light only when said complements of said actual output logic signals and said desired logic signals are both at logic high levels;

means for detecting when light is included in either of said first or second plurality of optical signals, wherein detec-

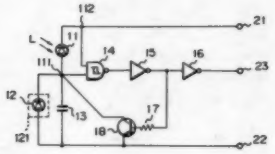
tion of light indicates the occurrence of a logic error in one or more of said actual output logic signals.

4,714,827

PHOTO-ELECTRIC CONVERSION DEVICE WITH DARK CURRENT COMPENSATION

Shigeyuki Akita, Okazaki, Japan, assignor to Nippon Soken, Inc., Nishio, Japan

Filed Jan. 13, 1986, Ser. No. 818,606
Claims priority, application Japan, Jan. 18, 1985, 60-8222
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—214 C **7 Claims**



1. A photo-electric conversion device for converting a light intensity into an oscillation frequency in a digital signal form, comprising:

a first photodiode in which a current is changed in accordance with a light intensity;

a second photodiode connected in series with said first photodiode for passing a current in the same direction as in said first photodiode;

a light shielding structure for shielding said second photodiode with regard to light;

a capacitor, connected in series with said first photodiode and in parallel with said second photodiode, for charging-/discharging a current from said first photodiode; and

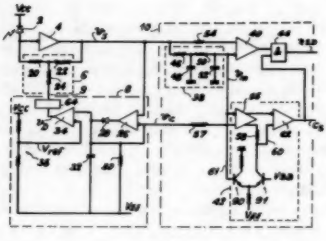
an oscillator structure for performing a switching operation in accordance with a charging/discharging operation of said capacitor so as to generate an oscillation voltage output, wherein an electric charge which is caused by a dark current from said first photodiode flowing through said capacitor is discharged through said second photodiode such that said capacitor is always charged only by a current caused by received light detected by said first photodiode.

4,714,828

OPTOELECTRIC TRANSDUCER

Claude Bacou, Neauphle le Chateau; Rene Baptiste, Maurepas; Henri Feissel, Paris; Gilbert Takats, Saint Denis, and Christian Cabrol, Plaisir, all of France, assignors to Bull S.A. (Societe Anonyme), Paris, France

Filed Mar. 14, 1986, Ser. No. 839,719
Claims priority, application France, Mar. 14, 1985, 85 03745
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—214 C **17 Claims**



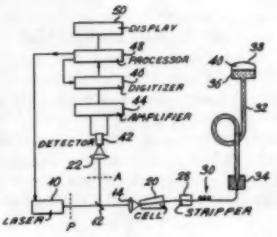
1. An optoelectronic circuit transducer comprising a diode (2) for providing a current in response to reception of a light signal, an amplifier (4) having an input connected to receive current from said diode and having an output, a negative feedback transfer impedance (6) connected between the amplifier output and the amplifier input, a stabilizing means (8) stabilizing the negative feedback of the transfer impedance responsive to the level of the peak (v_c) of the output signal (v_s) of the amplifier (4), and an automatic threshold device (10) supplying an output signal (RSD) in response to an output signal of said amplifier, and wherein said transfer impedance includes first, second, and third resistors, each resistor having a first end connected to a common node, and said first resistor also has a second end connected to the amplifier input, said second resistor also has a second end connected to the amplifier output, and said third resistor also has a second end connected to said stabilizing means (8).

4,714,829

FIBRE OPTIC SENSING DEVICE AND METHOD

Arthur H. Hartog, and David N. Payne, both of Southampton, England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 495,400, May 17, 1983, abandoned.
This application Mar. 17, 1986, Ser. No. 841,019
Claims priority, application United Kingdom, May 18, 1982, 8214384
Int. Cl.[4] H01J *5/16*
U.S. Cl. 250—227 **8 Claims**



1. Detector apparatus including a fibre optic sensor comprising:

a length of optical fibre having a core and a sheath respectively comprising materials the refractive indices of which vary differentially in accordance with a physical variable to be sensed and which causes corresponding changes in the back-scattering of radiation injected into the optical fibre,

optical pulse supply means for supplying to said length of optical fibre a pulse of electromagnetic radiation at wavelengths in a range including visible, ultraviolet and infrared wavelengths,

mode filter means for rendering said detector apparatus substantially insensitive to changes in a numerical aperture of said fibre core;

radiation sensing means positioned to receive optical radiation back-scattered by the length of optical fibre,

detector means responsive to said radiation sensing means to provide an output signal dependent on the intensity of the back-scattered radiation,

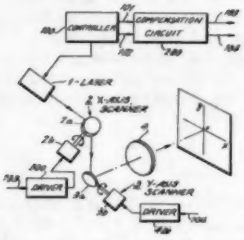
processor means coupled to said detector means for deriving from said output signal a control signal dependent on sensor variations in said physical variable comparator means to compare changes in said control signal with a predetermined algorithm, and

output means responsive to said control signal for providing an output signal dependent on said sensor variations.

4,714,830
LIGHT BEAM POSITIONER WITH SCAN DISTORTION COMPENSATION

Takeshi Usui, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Apr. 21, 1986, Ser. No. 854,042
Claims priority, application Japan, Apr. 19, 1985, 60-82650
Int. Cl.[4] H01J 3/14
U.S. Cl. 250—234 **3 Claims**



1. A light beam positioner, comprising:

first beam scanning means for deflecting a light beam at a first angle in a first direction in response to a first compensated control signal;

second beam scanning means for receiving the light beam which is produced by said first beam scanning means and, in response to a second compensated control signal, for deflecting the received light beam at a second angle in a second direction which is orthogonal to the first direction;

an objective lens for focusing the light beam produced by said second beam scanning means;

controller means for generating first and second uncompensated control signals which are respectively proportional to the first and second angles;

scan distortion compensating means for generating first and second intermediate signals which are dependent on the first and second uncompensated control signals, subtracting the first intermediate signal from the first uncompensated control signal to generate the first compensated control signal, and adding the second intermediate signal to the second uncompensated control signal to generate the second compensated control signal; and

drive means for driving the first and second beam scanning means responsive to the first and the second compensated control signals, respectively.

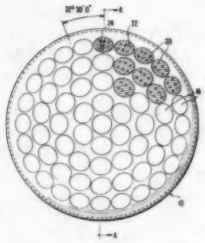
4,714,831
SPHERICAL RETARDING GRID ANALYZER

Gregory J. Clark, Katonah; Praveen Chaudhari, Briarcliff Manor; Jerome J. Cuomo, Lincolndale; Margaret A. Frisch, Mahopac, and James L. Speidell, Carmel, all of N.Y., assignors to International Business Machines, N.Y.

Filed May 1, 1986, Ser. No. 859,102
Int. Cl.[4] H01J 40/04
U.S. Cl. 250—305 **13 Claims**

1. A spherical grid for focussing charged particles comprising:

a rigid spherical frame having a number of openings therein; and

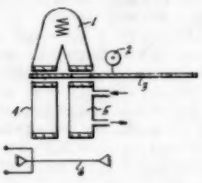


flat grid elements defining a mesh for said spherical grid placed in said openings.

4,714,832
PHOTOMETER

Walter Fabinski, Kriftel, Fed. Rep. of Germany, assignor to Hartmann & Braun AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 10, 1985, Ser. No. 753,659
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1984, 3426472; Dec. 20, 1984, 3446436
Int. Cl.[4] G01N 21/35
U.S. Cl. 250—343 **12 Claims**



1. Photometer including one measuring beam, traversing a chamber containing measuring gas, the improvement comprising a solid state detector positioned directly adjacent an exicting window of the chamber and being comprised of a foil made of polyvinyl-idene-fluoride, polyvinyl fluoride, or polyvinyl chloride and having an area being at least as large as the cross sectional area of radiation leaving said measuring chamber, and means for extracting a measuring signal from the foil.

6. Photometer, including at least one measuring beam traversing a measuring chamber containing measuring gas, the improvement comprising:

a solid state detector being comprised of a foil made of polyvinyl-idene-fluoride, polyvinyl fluoride, or polyvinyl chloride, and having an area being as large as a cross-sectional area of radiation leaving said measuring chamber;

said foil being contained in a gas-filled, infrared absorbing, receiving and detecting chamber, having a window facing said measuring gas containing chamber to receive therefrom radiation, the radiation received by and in said receiving chamber being pyroelectrically as well as piezoelectrically effective;

means for extracting a measuring signal from the foil; and

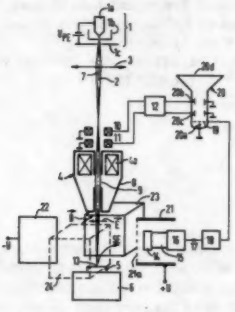
means connected for separating a piezoelectric component from a pyroelectric component as contained in said mesuring signal.

4,714,833

ARRANGEMENT FOR DETECTING SECONDARY AND/OR BACKSCATTER ELECTRONS IN AN ELECTRON BEAM APPARATUS

Harald Rose, Darmstadt; Joachim Zach, Nauheim, and Burkhard Lischke, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 11, 1986, Ser. No. 895,310
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1985, 3532781
Int. Cl.[4] H01J *37/244*
U.S. Cl. 250—397 14 Claims



1. An arrangement for detecting secondary electrons and/or backscatter electrons resulting from a primary electron beam being focused substantially along an electron-optical axis onto a specimen, comprising:

at least two electrodes disposed in a plane perpendicular to the electron-optical axis;

means for generating an electrical extraction field between said at least two electrodes to extract the secondary electrons and/or backscatter electrons to at least one of said electrodes;

at least one detector disposed directly behind and adjacent to one electrode to which the electrons are extracted;

at least two magnetic pole members disposed in the plane of said at least two electrodes and generating a magnetic field substantially perpendicular to the electrical extraction field, the strength and direction of the magnetic field exerting a force on electrons in the primary beam to compensate a force exerted on the primary beam electrons by the electrical extraction field but the magnetic field exerting a force on the secondary electrons and/or backscatter electrons to promote extraction toward said detector.

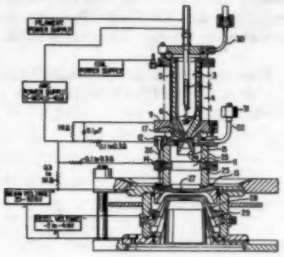
4,714,834

METHOD AND APPARATUS FOR GENERATING ION BEAMS

Murray R. Shubaly, Deep River, Canada, assignor to Atomic Energy of Canada, Limited, Ottawa, Canada

Continuation-in-part of Ser. No. 703,502, Feb. 20, 1985. This application Aug. 19, 1985, Ser. No. 767,048
Claims priority, application Canada, May 9, 1984, 4539753
Int. Cl.[4] H01J *27/20*
U.S. Cl. 250—427 15 Claims

1. An ion beam source apperatus of the type comprising cathode means in a cathode chamber for generating an electron beam, means for collimating said electron beam, aperture means in said cathode chamber for admitting the collimated electron beam into an ionizing chamber for containing an ion plasma, anode means at one end of said ionizing chamber adjacent said aperture means, and ion beam extraction means at the opposite end of said ionizing chamber, CHARACTERIZED IN THAT said aperture means is a bore in said cathode chamber having a smaller cross-section adjacent said cathode means, said smaller cross-section being sufficient for electron beam passage therethrough, and said aperture means including



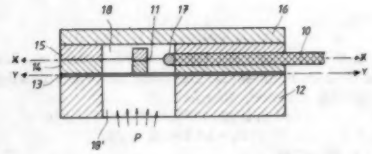
a predetermined length thereof having a predetermined uniform cross-section larger than said smaller cross-section.

4,714,835

OPTICAL POSITION-MEASURING SENSOR

Torgny Brgardh; Bertil Hök, and Christer Ovren, all of Västerås, Sweden, assignors to ASEA Aktiebolag, Västerås, Sweden

Continuation of Ser. No. 486,118, Apr. 18, 1983, abandoned. This application Nov. 6, 1985, Ser. No. 795,742
Claims priority, application Sweden, Apr. 21, 1982, 8202484
Int. Cl.[4] G01D *5/26*; G01J *3/443*
U.S. Cl. 250—486.1 16 Claims



1. An optical position-measuring sensor capable of determining the strength of an activating force which comprises

a monolithic structure which includes a flexible diaphragm which in its rest position extends in a plane and which can be flexed in a direction perpendicular to said plane by an activating force, and two masses of luminescent material resting on said flexible diaphragm so as to be moved when said flexible diaphragm is flexed, said two masses of luminescent material emitting, on excitation, different characteristic spectra, and

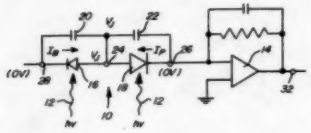
a wave guide, one end portion of said wave guide being stationarily mounted on said monolithic structure, said one end portion of said wave guide being straight and defining a center line which is parallel to said plane in which said flexible diaphragm extends in its rest position, said wave guide being capable of receiving luminescent light emitted by said two masses of luminescent material when excited, the wave guide and flexible diaphragm being positioned such that movement of said flexible diaphragm by an activating force which acts in a direction perpendicular to said plane causes said two masses to move relative to said one end portion of said wave guide, so as to change the proportion of luminescent light received by said wave guide from said two masses, so as to provide data from which the strength of said activating force is determined.

4,714,836

PHOTOSENSITIVE PIXEL WITH EXPOSED BLOCKING ELEMENT

Koichi Kitamura, Troy; Louis D. Swartz, Holly; Clive Catchpole, Birmingham, and Zvi Yaniv, Farmington Hills, all of Mich., assignors to Ovonic Imaging Systems, Inc., Troy, Mich.

Filed Sep. 16, 1986, Ser. No. 907,926
Int. Cl.[4] H04N *3/15*; H01L *27/14*
U.S. Cl. 250—578 **27 Claims**



1. A circuit for providing a detectable signal corresponding to the quantity of radiation incident upon a photosensitive pixel, the circuit comprising:

a photogenerative element including at least first and second electrodes;

means for selectively blocking current flow through at least a portion of the circuit, said blocking means including at least first and second electrodes;

the first electrode of the photogenerative element and the first electrode of the blocking means being electrically interconnected; and

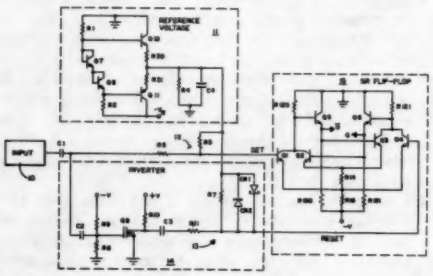
the second electrode of the photogenerative element and the second electrode of the blocking means held substantially at a common potential; whereby the stored detectable signal will not be dissipated by carrier pairs photogenerated by unmasked current blocking means.

4,714,837

HIGH SPEED FLIP-FLOP

Bart A. Wilson, Salt Lake City; Vaughn J. Jenkins, Bountiful, and Dale D. Fonnesbeck, Daysville, all of Utah, assignors to Sperry Corporation, Blue Bell, Pa.

Filed Jul. 18, 1986, Ser. No. 886,916
Int. Cl.[4] H03K *3/286*
U.S. Cl. 307—289 **10 Claims**



1. A high speed, edge-triggered flip-flop circuit comprising,

set/reset flip-flop circuit means,

source means for supplying input signals,

inverter means connected to receive said input signals from said source means and to produce inverted input signals,

reference voltage source means for producing a reference voltage,

first summing means connected to receive said reference voltage from said reference voltage source means and said input signals from said source means and to provide an output signal representative of the combination thereof to a first input of said flip-flop circuit means, and

second summing means connected to receive said reference voltage from said reference voltage source means and said inverted input signals from said inverter means and to provide an output signal representative of the combination thereof to a second input of said flip-flop circuit means,

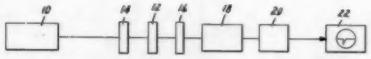
said first and second summing means comprise resistance networks.

4,714,838

SECOND HARMONIC GENERATION WITH N,N'-SUBSTITUTED BARBITURIC ACIDS

Roberta E. Harelstad, Eagan, and John Stevens, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 31, 1986, Ser. No. 925,300
Int. Cl.[4] H03F *7/00*
U.S. Cl. 307—427 **12 Claims**



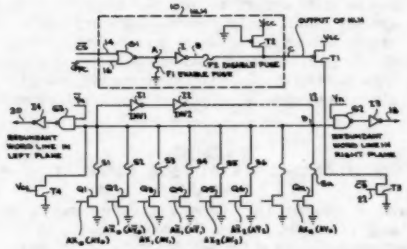
1. A second harmonic generator comprising a laser source of coherent light radiation at a fixed fundamental frequency, an organic molecular crystalline compound, means for directing the output radiation of the laser onto the compound, and output means for utilizing the second harmonic frequency, said compound being a N,N'-substituted barbituric acid which crystallizes in a non-centrosymmetric configuration, said compound being transparent to radiation at said fixed fundamental frequency and said second harmonic frequency.

4,714,839

CONTROL CIRCUIT FOR DISABLING OR ENABLING THE PROVISION OF REDUNDANCY

Shine C. Chung, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 27, 1986, Ser. No. 844,927
Int. Cl.[4] H03K *19/03, 19/096*
U.S. Cl. 307—441 **12 Claims**



6. A logic circuit for activating and deactivating redundant elements comprising:

(a) high-low-high circuit means including:

a NOR gate having two inputs and an output; said NOR gate having one input connected to receive a chip select signal and the other input connected to receive a precharging pulse signal;

an enable fuse having a first end connected to the output of said NOR gate and a second end connected to a ground potential;

a first inverter having an input and an output, the input of said first inverter being connected to the first end of said enable fuse;

a disable fuse having a first end connected to the output of said first inverter and a second end connected to an output node; and

a P-channel MOS transistor having its source connected to a supply potential, its gate connected to the ground potential, and its drain connected to the output node;

(b) dynamic latch means including:

a second P-channel MOS transistor having a source connected to the supply potential, a gate connected to the drain of said first P-channel MOS transistor, and a drain;

an N-channel MOS transistor having its drain connected to the drain of said second P-channel MOS transistor, its gate connected to the chip select input signal and its source connected to the ground potential;

a second inverter having an input and an output;

a third inverter having an input and an output, said third inverter having its input connected to the output of said second inverter and its output connected to the input of said second inverter so as to form a latch, the output of said third inverter being further connected to the drain of said N-channel transistor;

a first NAND gate having two inputs and an output, said first NAND gate having its first input connected to the drain of said N-channel transistor and its second input connected to a true address signal;

a fourth inverter having an input and an output, the input of said fourth inverter being connected to the output of said first NAND gate and the output of said fourth inverter being connected to a redundant element control line in a right plane;

a second NAND gate having two inputs and an output, said second NAND gate having its first input connected to the drain of the N-channel transistor and its second input connected to a complement address signal; and

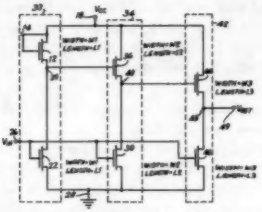
a fifth inverter having an input and an output, the input of said fifth inverter being connected to the output of said second NAND gate and the output of said fifth inverter being connected to a redundant element control line in a left plane.

4,714,840

MOS TRANSISTOR CIRCUITS HAVING MATCHED CHANNEL WIDTH AND LENGTH DIMENSIONS

Robert J. Proebsting, Plano, Tex., assignor to Thomson Components - Mostek Corporation, Carrollton, Tex.

Filed Dec. 30, 1982, Ser. No. 454,778
Int. Cl.[4] H03K *17/687*
U.S. Cl. 307—443 **1 Claim**



1. A circuit arrangement including first and second voltage supply terminals between which the voltage supply is to be applied, an input terminal to which an input signal is to be applied, and an output terminal at which an output signal is to be derived, and first, second and third amplifier stages,

each stage including a driver transistor and a load transistor,

each transistor being of the enhancement node type and including a source and a drain spaced by a channel and an insulated gate overlying the channel,

the drive and load transistors of each stage having equal channel lenghts and widths, in each stage the source of the driver transistor being connected to the first voltage supply terminal, the drain of the driver transistor being connected to the source of the load transistor at a source-drain node, the drain of the load transistor being connected to the second voltage supply terminal, and the gate of the driver transistor being connected to the input terminal,

in the first stage, the gate of the load transistor being connected to the drain of the load transistor,

in the second stage, the gate of the load transistor being connected to the source-drain node of the first stage,

in the third stage, the gate of the load transistor being connected to the source-drain node of the second stage, and

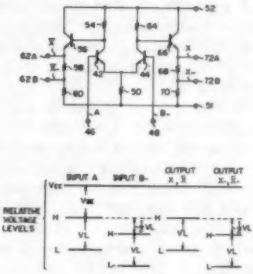
the source-drain node of the third stage being connected to the output terminal.

4,714,841

DOUBLE-SIDED LOGIC INPUT DIFFERENTIAL SWITCH

Norio Shoji, Tokyo, and Masashi Takeda, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jun. 25, 1985, Ser. No. 748,596
Claims priority, application Japan, Jun. 30, 1984, 59-136236
Int. Cl.[4] H03K *19/086, 19/092, 19/003, 17/60*
U.S. Cl. 307—455 **20 Claims**



1. A logic circuit of the kind employing a differential amplifier having a plurality of transistors connected in a common emitter configuration, and a constant current source connected to said differential amplifier and a voltage source, comprising:

first input means connected to a base of a first one of said plurality of differential amplifier transistors for receiving a binary input signal having a preselected difference between high and low amplitudes thereof;

second input means connected to a base of a second one of said plurality of differential amplifier transistors for receiving a second binary input signal also having said preselected difference between high and low amplitudes thereof and being level shifted relative to said first input signal by an amount equal to $\frac{1}{2}$ of said preselected difference; and

output means connected to a collector of one of said differential amplifier transistors for producing output signals having amplitude levels responsive to said first and second binary input signals, with at least one of said output signals being level shifted by said $\frac{1}{2}$ of said preselected difference to be available as said second binary input signal to a following logic circuit, whereby said output signals are obtained without a reference voltage being applied to said differential amplifier.

4,714,842

INTEGRATED INJECTION LOGIC CIRCUITS

Cornelis M. Hart, and Arie Slob, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

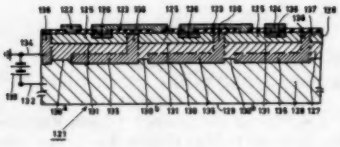
Division of Ser. No. 876,219, Feb. 9, 1978, Pat. No. 4,286,177, which is a continuation of Ser. No. 674,065, Apr. 5, 1976, abandoned, which is a continuation of Ser. No. 505,663, Sep. 13, 1974, abandoned, which is a continuation of Ser. No. 253,348, May 15, 1972, abandoned. This application Dec. 3, 1980, Ser. No. 212,582

Claims priority, application Netherlands, May 22, 1971, 7107040

The portion of the term of this patent subsequent to Aug. 25, 1999, has been disclaimed.

Int. Cl.[4] H03K *19/091*

U.S. Cl. 307—477 18 Claims



1. A monolithic integrated logic circuit comprising:

a common semiconductor body provided with a plurality of bipolar transistors adjacent a major surface thereof and each including outer zones and a first type conductivity medial active zone making rectifying contact with said outer zones and forming at least three successive active zones through which current can be caused to flow when appropriately biased,

biasing means to cause current flow through the semiconductor bipolar transistors, said biasing means comprising at least one current injector having an elongated current injection region and a succeeding region forming a current injector rectifying junction with said elongated region, at least said elongated region and said rectifying junction being separate from the transistor active zones, said rectifying junction being spaced from a respective medial active zone of at least first and second transistors, said medial active zones being displaced side by side and lengthwise of said elongated current injection region and both facing said current injector rectifying junction,

means for forward biasing said current injector rectifying junction so as to cause the injection of charge carriers from said elongated region into said succeeding region and thereby tending to cause collection of charge carriers by the medial active zones of both said first and second transistors, thereby tending to cause a rectifying junction between each medial active zone and an adjacent active zone of each of said first and second transistors to become forward biased tending to produce current flow through said first and second transistors' active zones,

the charge carrier-collecting relationship of the medial active zone of said first transistor to the current injector rectifying junction being different from the corresponding relationship for said second transistor and such that the latter's medial active zone can receive a bias current higher than that which can be received by the first transistor's medial active zone, thereby enabling the second transistor to operate at a higher current level than the first transistor,

and means interconnecting said first and second transistors as part of the same logic circuit for initiating or utilizing their current flow in said logic circuit.

4,714,843

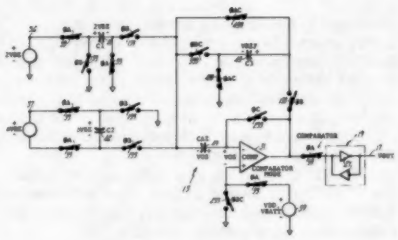
SEMICONDUCTOR CHIP POWER SUPPLY MONITOR CIRCUIT ARRANGEMENT

Michael D. Smith, Lewisville, Tex., assignor to Thomson Components-Mostek Corporation, Carrollton, Tex.

Filed Aug. 30, 1985, Ser. No. 771,319

Int. Cl.[4] G06G *7/10*; H03F *1/02*; H03K *5/00*

U.S. Cl. 307—491 4 Claims



1. A circuit arrangement for monitoring the power supply of N-well CMOS device comprising

an amplifier (31) having two inputs including an inverting input,

a non-inverting input and a single output, and adapted to be switched between modes including a comparator mode and an amplifying mode,

an output terminal,

an input terminal to which is applied the supply voltage being monitored,

a first switch means, serially connected between the output of the amplifying means and the output terminal, which when closed connects the output of the amplifying means to the output terminal,

a second switch means, connected between the input terminal and one of the two inputs of the amplifying means, which when closed provides a sample of the supply voltage on said one input of the amplifying means,

a ground terminal,

a third switch means, connected between the ground terminal and said one input of the amplifying means, which is operated out of phase with said second switch,

a first capacitor means having first and second terminals across which is periodically stored a reference voltage for comparison with the supply voltage,

means for periodically storing the reference voltage on said first capacitor means,

fourth, fifth, sixth, and seventh switch means,

an input capacitor means including first and second terminals of which said first terminal is connected to the other of the two inputs of the amplifier means, and of which said second terminal is connected to the first terminal of the first capacitor by way of said fifth switch and to the second terminal of the first capacitor means by way of the sixth switch means, said second terminal of the first capacitor means also being connected to the ground terminal by way of the seventh switch means,

the fourth switch means being connected between the output of the amplifier means and said other input of the amplifier, and

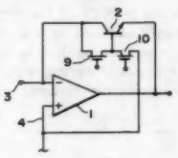
means for periodically connecting said one terminal of the input capacitor means to the output of the amplifier means.

4,714,844

LOGARITHMIC COMPRESSION CIRCUIT

Kazuhiko Muto, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1986, Ser. No. 848,292
Claims priority, application Japan, Apr. 11, 1985, 60-75273
Int. Cl.[4] G06G 7/24; H03K 5/22, 17/687
U.S. Cl. 307—494 7 Claims



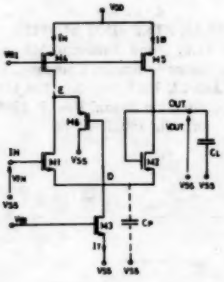
1. A logarithmic compression circuit comprising:
an operational amplifier having inverting and noninverting inputs and an output;
a transistor having an emitter, a collector and a base for logarithmic compression, one of the emitter and collector of said transistor being connected to the inverting input of said operational amplifier, the other of the emitter and collector of said transistor being connected to the output of said operational amplifier; and
switching means, connected between the base of said transistor and the non-inverting input of said operational amplifier, for connecting the base of said transistor to the non-inverting input of said operational amplifier in response to a generation of a low level signal at the inverting input of said operational amplifier and for connecting the base of said transistor to the inverting input of said operational amplifier in response to a generation of a high level signal at the inverting input of said operational amplifier.

4,714,845

LOW OFFSET VOLTAGE FOLLOWER CIRCUIT

Daniele Devecchi, Desio, and Guido Torelli, Alessio, both of Italy, assignors to SGS Microelettronica SpA, Agrate Brianza, Italy

Filed Nov. 28, 1986, Ser. No. 936,112
Claims priority, application Italy, Nov. 27, 1985, 23010 A/85
Int. Cl.[4] H03K 17/687, 19/003, 3/353; H03G 1/04
U.S. Cl. 307—496 8 Claims



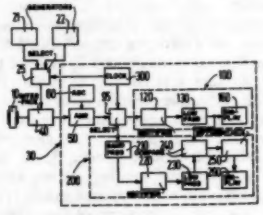
1. A low offset voltage follower circuit having a substantially unity voltage gain comprising at least one input terminal for connection to a voltage generator and at least one output terminal for connection to a load, and using complementary MOS type transistors, said voltage follower circuit comprising first, second and third transistors having a first type of conductivity, and fourth, fifth and sixth transistors having a second type of conductivity which is opposite to said first type of conductivity, said first and second transistors having source electrodes connected to a drain electrode of said third transistor, said third transistor having source and gate electrodes which are respectively connected to a first terminal of a supply voltage source and to a first voltage reference means for keeping said gate electrode at a constant potential with respect to said first terminal of said supply voltage source, a gate electrode of the first transistor forming said input terminal of said follower circuit, said fourth and fifth transistors having source electrodes connected to a second terminal of said supply voltage source, said fourth and fifth transistors having gate electrodes connected to a second voltage reference means for keeping said gate electrodes at a constant potential with respect to said second terminal of said supply voltage source, said fourth transistor having a drain electrode connected to a drain electrode of said first transistor and to a source electrode of said sixth transistor, said sixth transistor having drain and gate electrodes which are respectively connected to said first terminal of said supply voltage source and to source electrodes of said first and second transistors, said second transistor having drain and gate electrodes connected to a drain electrode of said fifth transistor at a circuit node which forms said output terminal of said follower circuit.

4,714,846

APPARATUS FOR THE EXAMINATION OF OBJECTS WITH ULTRA-SOUND, COMPRISING AN ARRAY OF PIEZO-ELECTRIC TRANSDUCER ELEMENTS

Patrick R. Pesque, Perigny, and Jean-Marie C. Nicolas, Paris, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 22, 1986, Ser. No. 921,982
Claims priority, application France, Oct. 25, 1985, 85 15849
Int. Cl.[4] H01L 41/08
U.S. Cl. 310—317 2 Claims



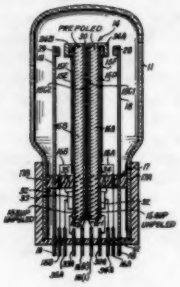
1. An apparatus for the examination of objects with ultrasound, comprising:
a linear array of piezo-electric transducer elements each having a width W and a thickness T, wherein the thickness T of each of the transducer elements is equal to one half of a wavelength corresponding to a first frequency F for which on a diagram of curves $F \cdot T = f(W/T)$ of the distribution of the resonant frequencies there exists a first vibratory mode at the said first frequency F and a second vibratory mode at or near a second frequency equal to 2F;
transmission means which excite the elements at the first frequency F using excitation signals having a spectrum which excludes the second frequency 2F; and
means functionally connected to the elements for receiving and processing echo signals which are received by the elements at said frequency 2F.

4,714,847

ADVANCED PIEZOECERAMIC POWER SWITCHING DEVICES EMPLOYING PROTECTIVE GASTIGHT ENCLOSURE AND METHOD OF MANUFACTURE

John D. Harnden, Jr., Schenectady; William P. Kornrumpf, Albany, and George A. Farrall, Rexford, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 21, 1984, Ser. No. 685,108
Int. Cl.[4] H01L 41/08
U.S. Cl. 310—332 27 Claims



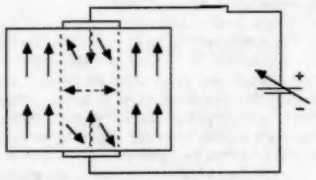
1. A controlled atmosphere bender-type piezoelectric ceramic electrical switching device that is operated as a normally-open three-position switch comprising a gastight protective enclosure secured to a base member for supporting the enclosure and sealing closed the interior of the enclosure in a gastight manner, at least one binder-type piezoelectric ceramic switching device having movable contacts that is positioned between a pair of fixed contacts to close one of said fixed contacts upon selective energization of said bender-type switching device producing movement in the direction of said fixed contact whereas the other of said fixed contacts is closed upon successive selective energization of said bender-type switching device causing movement in the opposite direction toward said other fixed contact and with both of said fixed contacts being opened by return movement of said bender-type switching device to its original unenergized position when energization of said bender-type switching device is discontinued, said bender-type switching device comprising a bender member formed by a two juxtaposed selectively prepolarized ceramic planar plate elements secured together sandwich fashion with each plate element having at least inner and outer conductive surfaces formed on the planar surfaces thereof together with respective terminal means for selective application of energizing electric operating potentials to the prepolarized portions of the respective plate elements, said bender-type piezoelectric ceramic switching device being physically supported on said base member within said enclosure by clamping means secured on opposite sides of the bender member at non-prepolarized portions of the respective plate elements and physically supporting the bender member cantilever fashion with only the prepolarized portions thereof being freely movable whereas the non-prepolarized portions of said piezoelectric ceramic plate elements clamped under said clamping means remain both electrically neutral and physically unstrained, said movable contacts within said gastight enclosure being located on the prepolarized portions of the respective ceramic plate elements and moved by the free movable end of said bender member, said fixed contacts physically mounted within said gastight enclosure and selectively engageable by said movable contacts upon the selective application of an energizing electric operating potential to a respective one of the piezoelectric plate elements for causing the prepolarized portion of the bender member to bend and close the electric switch contacts of said bender-type piezoelectric ceramic electrical switching device to allow electric current flow therethrough, respective electrically conductive lead means connected to respective one of said coacting movable and fixed contacts and extending to respective terminal means supported by said base member outside said protective gastight enclosure for selectively supplying electric load current to a load outside said enclosure via said coacting movable and fixed contacts, and switch energization circuit means operatively associated with said bender-type piezoelectric ceramic electrical switching device which selectively applies a source of bender energization potential to the prepolarized movable bender portion of each ceramic plate element in a successive manner and having the same polarity as the polarity of the prepoled electric field previously permanently induced in said selectively prepolarized movable bender portion so that no depolarization of the ceramic plate elements occur during successive operations of the bender-type piezoelectric ceramic electrical switching device.

4,714,848

ELECTRICALLY INDUCED MECHANICAL PRECOMPRESSION OF FERROELECTRIC PLATES

Peter J. Chen, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 2, 1987, Ser. No. 20,996
Int. Cl.[4] H01L 41/08; H04R 17/00
U.S. Cl. 310—359 11 Claims



1. A method of mechanically precompressing a ferroelectric plate having opposed surfaces and including an outer portion surrounding a central portion, said method comprising the steps of:

electrically polarizing said plate, whereby the plate is axially stretched and laterally shrunk; and

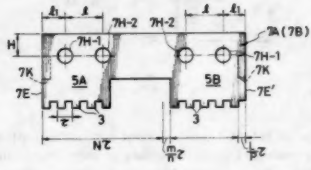
electrically partially depolarizing only the central portion of said plate, whereby the central portion is laterally expanded against the outer portion of said plate.

4,714,849

LINEAR STEPPING MOTOR

Sakae Yamamoto, Atsugi, and Tsutomu Mizuno, Kanagawa, both of Japan, assignors to Amada Company, Limited, Japan

Filed Jul. 12, 1985, Ser. No. 754,131
Claims priority, application Japan, Feb. 9, 1985, 60-022770
Int. Cl.[4] H02K 41/00
U.S. Cl. 310—12 4 Claims



1. A linear stepping motor comprising:

a long non-exciting iron core formed with a number of denticles having a constant pitch τ;

a first exciting core having two field legs formed with a

number of denticles having a constant pitch τ, a first field leg of said two field legs arranged to provide no phase shift with respect to the denticles of said non-exciting iron core, a second field leg arranged to provide a phase shift of no more than $(L/P)\cdot\tau$ with respect to the same denticles of said non-exciting iron core, where L denotes an integer smaller than the number of field leg poles P;

a second exciting core having the same shape and dimension of said first exciting core and having two field legs formed with a number of denticles having the constant pitch τ, a first field leg of said two field legs arranged to provide a phase shift of no more than $(L/P)\cdot\tau$, a second field leg arranged to provide no phase shift with respect to the denticles of said non-exciting iron core in diagonal phase-shift positional relationship between the field legs of said two exciting cores;

a pair of permanent magnets respectively mounted on said two excited iron cores; and

a yoke mounted on said pair of permanent magnets to form a magnetic field in a transverse direction of a longitudinal motion of said linear stepping motor.

4,714,850

STEPPING MOTOR

Yasuhiro Akiba, Osaka; Masato Namba, Katano; Seiji Kikuchi, Nishinomiya, and Hidenobu Soejima, Higashiosaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

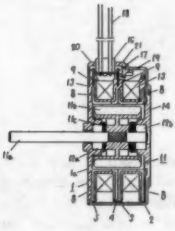
PCT No. PCT/JP85/00611, § 371 Date Jul. 8, 1986, § 102(e) Date Jul. 8, 1986, PCT Pub. No. WO86/03071, PCT Pub. Date May 22, 1986

PCT Filed Nov. 5, 1985, Ser. No. 887,031

Claims priority, application Japan, Nov. 8, 1984, 59-235536

Int. Cl.⁴ H02K *37/00*

U.S. Cl. 310—49 R **6 Claims**



1. A stepping motor comprising:

a rotor which includes a columnar- or cylindricalshaped permanent magnet magnetized in multiple poles on its periphery and a rotary shaft on its center,

a pair of first stator yokes having an inner radius that is slightly larger than an outer radius of said rotor and having plural pole teeth with uniform intervals in the axial direction and arranged so that a pair of said pole teeth are placed alternately and on a same periphery,

a pair of second stator yoke having an inner radius that is slightly larger than the outer radius of said rotor and having plural pole teeth with uniform intervals in the axial direction and arranged so that a pair of said pole teeth are placed alternately and on a same periphery and are disposed back to back on a same axis of said first stator yokes with a rotation of stepping angle,

a cylindrical housing monlithically resin-moulded together with said first yokes and said second yokes, a bearing holder member on one side end plane of said cylindrical housing and provided at its center with a bearing for rotatably holding said rotary shaft,

a coil bobbin member formed on an outer radius part of said cylindrical housing,

a stator coil winding wound on said coil bobbin,

a bracket which is inserted in an inner radius part of an open side of said cylindrical housing and is provided with a bearing for rotatably holding said rotor shaft, and

a frame of cup shape in which said stator is inserted and which combines said bearing holding member with said bracket.

4,714,851

SINGLE-PHASE SYNCHRONOUS MOTOR COMPRISING A TWO-POLE PERMANENT-MAGNET ROTOR

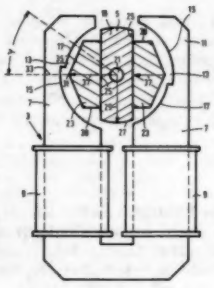
Leo Bertram, Stolberg, Fed. Rep. of Germany, and Hugo Schemmann, Schaesberg, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 21, 1986, Ser. No. 866,034

Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518694

Int. Cl.⁴ H02K *21/12*

U.S. Cl. 310—156 **8 Claims**



1. A single phase synchronous motor comprising

a stator having two arcuate poles, each pole having an arc portion of large diameter and an arc portion of small diameter, said arc portions of large diameter being diametrically opposed, said arc portions of small diameter being diametrically opposed,

a two-pole permanent magnet rotor between the poles of said stator, said rotor having median plane in which the axis of rotation lies, the direction of magnetization of said rotor being parallel to said median plane, the peripheral surface of the rotor having a shape which deviates from a cylindrical shape, the dimension of the rotor in the direction of magnetization being largest near the median plane.

4,714,852

PERMANENT-MAGNET FIELD SYNCHRONOUS MOTOR

Shigeki Kawada; Yoichi Amemiya; Masatoyo Sogabe, all of Hachioji, and Kazushi Kumagai, Hino, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP85/00473, § 371 Date Jun. 24, 1986, § 102(e) Date Jun. 24, 1986, PCT Pub. No. WO86/01651, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 28, 1985, Ser. No. 862,358

Claims priority, application Japan, Aug. 29, 1984, 59-178242

Int. Cl.⁴ H02K *21/12*

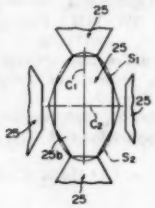
U.S. Cl. 310—156 **2 Claims**

1. A permanent-magnet field synchronous motor comprising:

a rotor body having a cylindrical outer surface; and

a plurality of permanent magnets attached to said cylindrical outer surface of said rotor body, each of said permanent magnets having a constant thickness, such that an outer surface thereof extends circumferentially parallel with said cylindrical outer surface of said rotor body, each permanent magnet having a polygonal shape, said polygo-

nal shape having a shape approximating that formed by a contour line superimposed upon said rotor body, said contour line having the shape of a half-sine curve above a center line superimposed circumferentially around said rotor body and said contour line having a mirror image of the half-sine curve below the centerline, said polygonal



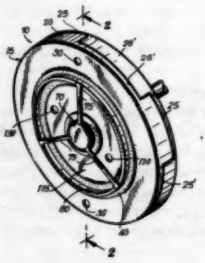
shape also being inscribed in said contour line, and wherein each of said plurality of permanent magnets have the same configuration and are arranged and spaced from one another circumferentially around said rotor body, and are arranged with at least one of said permanent magnets being adjacent to another in the axial direction of the rotor body.

4,714,853

LOW PROFILE ELECTRIC MOTOR

Albert Palmero, Harwinton, and Charles Hansen, Wolcott, both of Conn., assignors to Tri-tech, Inc., Waterbury, Conn.

Filed Sep. 4, 1986, Ser. No. 903,470
Int. Cl.[4] H02K *21/14*
U.S. Cl. 310—257 **7 Claims**



1. A synchronous electric motor comprising, in combination:

an annular permanent magnet rotor having rotor poles of alternating polarity around its circumference;

an outer stator comprising a first pair of pole pieces of annular configuration in opposed relationship with each other to form an annular space therebetween, each of said first pair of pole pieces being disposed around the outer periphery of said rotor, each said pole piece in said first pair including on its inner periphery spaced-apart, axially extending salient stator pole in magnetic flux relationship with the rotor poles, with the stator poles of the respective pole pieces being interleaved with one another;

an inner stator comprising a second pair of pole pieces of annular configuration in opposed relationship with each other to form an annular space therebetween, each of said seoond pair of pole pieces being disposed within the inner periphery of said rotor, each said pole piece in said second pair including on its outer periphery spaced-apart, axially extending salient stator poles in magnetic flux relationship with the rotor poles, with the stator poles of the respective pole pieces being interleaved with one another;

first annular energizing means surrounding the outer periphery of the rotor and comprising electrically conductive wire annularly wound substantially entirely within the annular space between the first pair of stator pole pieces for producing a magnetic field in the salient stator poles of said first pair; and

second annular energizing means within the inner periphery of the rotor and comprising electrically conductive wire annularly wound substantially entirely within the annular space between the second pair of stator pole pieces for producing a magnetic field in the salient stator poles of said second pair; and

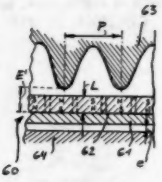
means for sequentially energizing said first and second energizing means to respectively produce the corresponding magnetic field with said fields in different phase relationship with each other.

4,714,854

ELECTRIC MOTOR WITH A MULTIPOLAR PERMANENT MAGNET ROTOR

Claude Oudet, Besancon, France, assignor to Portescap, La Chaux-de-fonds, Switzerland

Filed Jun. 30, 1986, Ser. No. 880,160
Int. Cl.[4] H02K *37/14*
U.S. Cl. 310—268 **6 Claims**



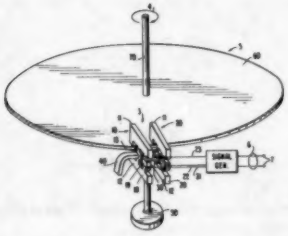
2. An electric motor comprising a stator and a movable member with a multipolar permanent magnet formed of a magnetic material having a substantially linear demagnetization characteristic in the field of use of said multipolar permanent magnet, said movable member having two parallel, substantially planar surfaces on a first one of which appears the magnetic poles of said permanent magnet, said planar surfaces being spaced apart by a distance L substantially smaller than the diameter of said parallel surfaces, the direction of magnetization being perpendicular to said surfaces, and said permanent magnet having on said first one of said planar surfaces at least one series of magnetic poles of one polarity, the centers of said magnetic poles being spaced apart from each other by a length P measured along the path of their movement, said movable member comprising a flat yoke part of magnetically permeable material having a substantially constant thickness and forming the second of said substantially planar surfaces, the stator of the motor comprising at least one magnetic circuit coupled with at least one electric energizing coil, said circuit comprising at least one polar part facing said first substantially planar surface of the movable member and defining with said yoke part part of an air-gap having a width that varies along the direction of movement of said movable member and has a minimum value E', the regions where said minimum values occur being spaced along the direction of movement of said movable member at least approximately by said length P, wherein said minimum value E' satisfies the relationship $0.385\ P+1.4 \leqq P/2E' \leqq 0.706\ P+1.85$, P and E' being measured in mm.

4,714,855

PIEZO-ELECTRIC ACTUATOR AND STEPPING DEVICE USING SAME

Toshitaka Fujimoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed May 7, 1986, Ser. No. 860,392
Claims priority, application Japan, May 7, 1985, 60-96225
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 5 Claims



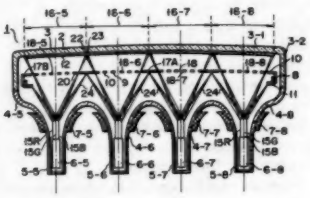
1. A stepping device comprising; a clamping assembly comprising first and second laterally spaced clamps, each clamp comprising two generally parallel arms having forward and rearward ends, first and second supports between said arms physically connecting said two arms at longitudinal spaced positions intermediate of said forward and rearward ends, one of said supports comprising an electric distortion element having elongation distortion in a direction tending to separate said arms, the other support constituting a hinge connection between said two arms, and a second electric distortion effect element fixedly connected at its end to respective sides of said supports constituting said hinge connection between the arms of said clamps, and a plate having an edge thereof positioned between opposed forward ends of said two arms of both clamps and mounted for movement in a direction through the gaps between the forward ends of said arms of said first and second clamps, such that controlled periodic application of electrical voltage selectively to said first electric distortion effect elements and said second electric distortion element of said assembly causes step movement of said plate relative to said first and second clamps.

4,714,856

COLOR CATHODE RAY TUBE WITH PLURAL ELECTRON GUN ASSEMBLIES

Shigeo Takenaka; Eiji Kamohara, and Takashi Nishimura, all of Fukaya, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 1, 1986, Ser. No. 858,002
Claims priority, application Japan, May 10, 1985, 60-97901
Int. Cl.[4] H01J *29/07, 29/50, 29/82, 29/86*
U.S. Cl. 313—2.1 6 Claims



1. A color cathode ray tube comprising:

a vacuum envelope including a panel having a single faceplate and a skirt extending from said faceplate, a plurality of funnels coupled to said panel, and a plurality of necks respectively extending from said plurality of funnels;

a plurality of electron gun assemblies respectively accomodated in said plurality of necks, each electron gun emitting a plurality of electron beams;

a plurality of deflection units respectively mounted around said plurality of funnels, each deflection unit being arranged to deflect electron beams emitted from a corresponding one of said plurality of electron gun assemblies;

a screen formed on said faceplate, including phosphor elements for emitting rays of different colors in response to impinging electron beams, and defined by a plurality of continuous segment regions scanned with electron beams emitted from corresponding ones of said plurality of electron gun assemblies and deflected by corresponding ones of said plurality of deflection units; and

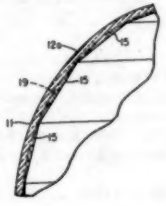
a mask received in the vacuum envelope and facing said faceplate and having a plurality of effective row and column regions corresponding to said plurality of segment regions and non-effective regions for surrounding and partitioning said effective row and column regions, said effective regions being provided with apertures for allowing passage of electron beams therethrough to impinge on said phosphor elements in the corresponding segment regions and said apertures being formed at predetermined pitches.

4,714,857

INFRARED REFLECTIVE LAMP WITH ENVELOPE HAVING STRAIGHT SECTIONS

Irving S. Goldstein, Teaneck, N.J., assignor to Duro-test Corporation, North Bergen, N.J.

Filed Apr. 21, 1986, Ser. No. 854,324
Int. Cl.[4] H01K *1/28, 1/32*
U.S. Cl. 313—112 15 Claims



1. An incandescent electric lamp comprising:

an envelope,

a wall of the envelope having an inner curved surface and a generally curved outer surface,

an incandescent filament located within said envelope,

means connecting said incandescent filament to a source of electrical power to cause it to incandesce, the curved inner surface of said envelope defined by a plurality of interconnected, substantially flat chord surfaces interposed to each other at an angle, and a coating of infrared reflecting visible light transmissive material coated on the inner surface of the envelope, whereby the inner curved surface of the envelope and orientation of said chord surfaces reflect infrared energy radiated by said filament back toward said filament.

4,714,858
CAPPED ELECTRIC LAMP COMPRISING A METAL SLEEVE HAVING A CORNER DEPRESSION TO ENGAGE AN ASSOCIATED RECESS IN AN INSULATOR BODY

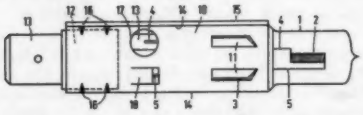
Rudolf Sanders, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 753,210, Jul. 9, 1985, abandoned. This application Mar. 5, 1987, Ser. No. 22,472

Claims priority, application Netherlands, Aug. 17, 1984, 8402524

Int. Cl.[4] H01J *5/48, 5/50*

U.S. Cl. 313—318 **7 Claims**



1. In a capped electric lamp comprising:

(a) a lamp vessel sealed in a vacuum-tight manner having an electric element arranged therein and having a pinch;

(b) a first and second current supply conductor, each conductor extending from the outside of said lamp vessel to said electric element, at least one conductor passing through said pinch;

(c) a metal sleeve having a substantially rectangular cross-section, said pinch of said lamp vessel being firmly fixed therein, said sleeve having a plurality of corners formed by intersections of respective planes of the sleeve;

(d) an insulator body having a substantially rectangular cross-section, said insulator body enclosed in said metal sleeve; and

(e) a contact member connected to said first current supply conductor, said contact member being immovably enclosed at least partially over its length by said insulator body and having one of its ends projecting from said insulator body and said metal sleeve;

the improvement therein comprising said insulator body being immovably held in said metal sleeve by at least one depression in at least one corner of said metal sleeve, said depression engaging a recess of said insulator body, and said depression being mainly a plastic deformation.

4,714,859
MAGNETRONS

Michael J. Clark, Watford, England, assignor to The M-O Valve Company Limited, England

Filed Mar. 21, 1986, Ser. No. 842,318

Claims priority, application United Kingdom, Mar. 25, 1985, 8507721

Int. Cl.[4] H01J *23/22*

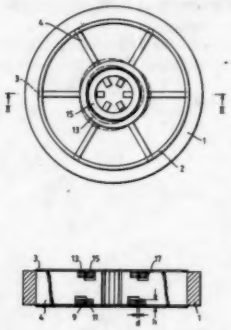
U.S. Cl. 315—39.67 **7 Claims**

1. A resonant cavity magnetron, comprising:

(a) a cylindrical anode having an axis and a plurality of inwardly extending radial vanes which together define multi-resonating cavities, said vanes having free edges;

(b) a cathode extending along the axis of said anode to define an interaction space between the free edges of said vanes and said cathode; and

(c) at least two coaxial straps of differing materials, said straps being connected to alternate different ones of said vanes and passing freely the vanes to which they are not connected, at least one of said straps having a greater coefficient of linear expansion than the vanes which it straps such that, on an increase in operating temperature, the straps with the greater coefficient of linear expansion will deform outwardly between its connections to its associated vanes to reduce the inter-strap and strap-to-vane capacitance in such a manner as to compensate for



the frequency variation which would otherwise have been caused by the temperature rises.

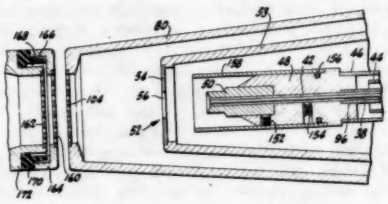
4,714,860
ION BEAM GENERATING APPARATUS

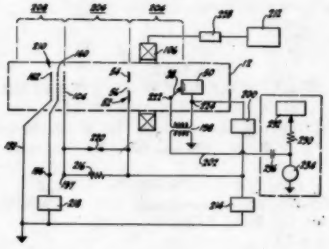
Ian G. Brown, 1088 Woodside Rd., Berkeley, Calif. 94708, and James Galvin, 2 Commodore #276, Emeryville, Calif. 94608

Filed Jan. 30, 1985, Ser. No. 696,460

Int. Cl.[4] H01J *7/24;* **H05B** *31/26*

U.S. Cl. 315—111.81 **10 Claims**





1. An ion generating apparatus comprising:

a. a structure providing a vacuum chamber;

b. a cathode and an anode placed apart a selected distance in one region within said vacuum chamber;

c. a source of electrical power defining an electrical potential between said cathode and anode;

d. means for producing an electrical arc between said cathode and anode sufficient to vaporize and ionize a portion of said cathode to form a plasma;

e. means for guiding said plasma away from said cathode and anode region in a predetermined direction to another region spaced from said anode and cathode;

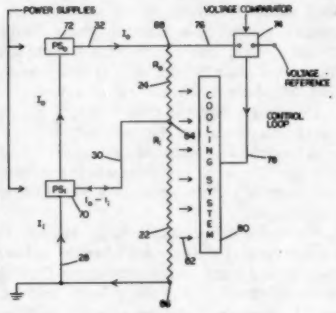
f. means for extracting ions from said plasma in said another region spaced from said cathode and anode region.

4,714,861

HIGHER FREQUENCY MICROCHANNEL PLATE

Christopher H. Tosswill, Sturbridge, Mass., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.

Filed Oct. 1, 1986, Ser. No. 913,955
Int. Cl.[4] H01J 7/24, 43/00
U.S. Cl. 315—117 11 Claims



1. A microchannel plate comprising a plurality of arrays, a first array in an electron-amplifying direction from a second array having a surface zone resistance lower than that of said first array.

8. In combination,

a microchannel plate,

a constant-current power supply for imposing voltage to cause current flow in said microchannel plate,

cooling means for said microchannel plate, and

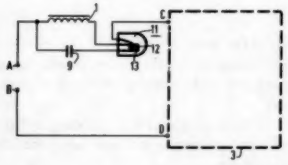
control means to regulate said cooling means to maintain operation of said microchannel plate at a predetermined temperature.

4,714,862

CIRCUIT ARRANGEMENT FOR IGNITING AND OPERATING GAS DISCHARGE LAMPS

Horst Dannert, Aachen; Hans-Günther Ganser, Stolberg; Ralf Schäfer, Aachen, and Hans-Peter Stormberg, Stolberg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 15, 1985, Ser. No. 787,394
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1984, 3438002
Int. Cl.[4] H05B 37/00
U.S. Cl. 315—244 11 Claims



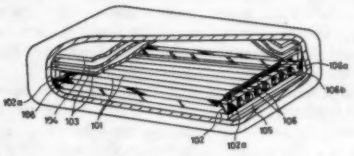
1. A circuit arrangement for igniting and operating gas discharge lamps comprising: a choke coil connected between a lamp and an a.c. supply source and having an inductance L, an ignition device connected to the lamp, a capacitor having a capacitance C connected in parallel with at least a part of the choke coil in order to pass an ignition current to the lamp that is higher than the normal lamp operating current, characterized in that the capacitor has a capacitive reactance that lies in a range between a minimum capacitive reactance of 3 times the choke coil inductive reactance and a capacitive reactance of approximately 20 times the choke coil inductive reactance.

4,714,863

VIBRATION DAMPING MEANS FOR THE LINE CATHODES OF AN IMAGE DISPLAY APPARATUS

Toshinobu Yokoyama, Hirakata; Sadao Watanabe, Ashiya, and Takatsugu Kurata, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 15, 1985, Ser. No. 766,003
Claims priority, application Japan, Aug. 30, 1984, 59-181324; Sep. 10, 1984, 59-189015
Int. Cl.[4] H01J 29/70
U.S. Cl. 315—366 6 Claims



1. An image display apparatus comprising:

line cathodes for emitting electron beams;

electron beam controlling means for controlling convergence, deflection and intensity of said electron beams;

a phosphor screen having a phosphor layer which emits light at impingement by said electron beams;

supporting means for supporting and stretching said line cathodes;

vibration damping means having at least a damping string which is provided across and lightly touching said line cathodes; and

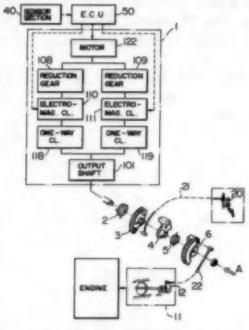
a vacuum enclosure containing the above-mentioned components therein.

4,714,864

THROTTLE CONTROL DEVICE FOR VEHICLES

Kazutoshi Yogo, and Hideo Wakata, both of Nagoya, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 23, 1986, Ser. No. 866,348
Claims priority, application Japan, May 27, 1985, 60-113932; Feb. 11, 1986, 61-28324
Int. Cl.[4] B60K 31/00; F02D 29/00
U.S. Cl. 318—52 17 Claims



1. A vehicle engine throttle control device comprising:

control means having at least one of first means to effect traction control for reducing the opening of a throttle valve of the vehicle engine upon detection of any slip of driving wheels of the vehicle, and a second means to

effect an automatic drive control for controlling the vehicle cruising speed in conformity with a command speed;

a first lever operatively connected to an accelerator of the vehicle;

said control means including an actuator for producing an actuating power in accordance with throttle opening control instructions;

a second lever operatively connected to said actuator so as to be actuated by said actuating power of said actuator, said second lever being operatively connected also to an engine throttle valve so as to be able to vary the opening of said throttle valve;

a third lever adapted to be urged by said first lever and by said second only in one direction; and

spring means disposed between said third lever and one of said first and second levers, said spring means being operative, when said second lever is moved with respect to said first lever in a direction to close said throttle valve, to prevent said one lever from being moved by said second lever.

17. A vehicle engine throttle control device comprising:

control means having at least one of a first means to effect traction control for reducing the opening of a throttle valve of the engine upon detection of any slip of driving wheels of the vehicle, and a second means to effect automatic drive control for controlling the vehicle cruising speed in conformity with a command speed;

a lever operatively connected to an accelerator of the vehicle;

said control means including an actuator for producing an actuating power in accordance with throttle opening control instructions;

another lever operatively connected to said actuator so as to be actuated by said actuating power of said actuator, the another lever being operatively connected to said throttle valve so as to be able to vary the opening of said throttle valve; and

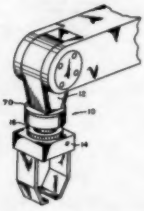
spring means arranged to resiliently act between said levers such that, when the first-said lever is moved in a direction to open said throttle valve, the another lever is also moved in the same direction and such that, when the another lever is moved independently of the first-said lever in a direction to close said throttle valve, said spring means takes up at least a part of the movement of the another lever to present the first-said lever from being moved by the another lever.

4,714,865

OVERLOAD PROTECTION DEVICE

Laurence D. Chin, West Newton; Christopher J. Hiscock, Georgetown, and Wayne H. Domeier, Boston, all of Mass., assignors to Barry Wright Corporation, Newton Lower Falls, Mass.

Filed Jun. 12, 1986, Ser. No. 873,619
Int. Cl.[4] G05B *9/02*
U.S. Cl. 318—563 **18 Claims**



1. An overload protector adapted to be secured between a robot arm and a tool, comprising:

a cylinder having a central axis, an open end and a closed end,

a floating piston located within the cylinder and having a central axis,

a plurality of electromagnetic sensors for generating an electronic signal proportional to the strength of the sensed electromagnetic field secured to the cylinder and lying in a common plane normal to the cylinder axis and equally spaced, angularly, relative to the cylinder axis,

a magnet for generating an electromagnetic field associated with each sensor, the magnets being secured to the piston in a common plane normal to the piston axis and equally spaced, angularly, relative to the piston axis,

means for pressurizing the closed end of the cylinder to move the piston toward the open end,

means to limit the movement of the piston toward the open end of the cylinder at a position where the common plane of the magnets and the common plane of the sensors are coincident, and

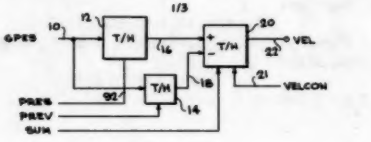
means responsive to the electronic signals from the sensors for depressurizing the cylinder when the piston and cylinder are moved relative to each other and the piston moves toward the closed end of the cylinder and the common plane of the magnets and the common plane sensors are moved out of coincidence and the resultant relative movement between at least one magnet and its associated sensor cause a signal to be generated by at least one of the sensors to deviate substantially from a predetermined value.

4,714,866

RATE-OF-CHANGE SIGNAL GENERATOR USING SAMPLING TECHNIQUES

Rudolph J. Sterner, Cupertino, and Steven Harris, Milpitas, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Apr. 28, 1986, Ser. No. 856,730
Int. Cl.[4] G05B *21/02*
U.S. Cl. 318—636 **11 Claims**



1. An apparatus for generating a first signal related to the rate of change of a second analog signal which has a constant value during each of a plurality of successive frame sample times comprising:

a first track and hold amplifier for tracking and holding the amplitude of said second signal at a first time during each frame sample time;

a second track and hold amplifier for tracking and holding the amplitude of said second signal at a second time during each frame sample time;

means for determining the amplitude difference in the amplitudes of the samples held in said first and second track and hold amplifiers; and

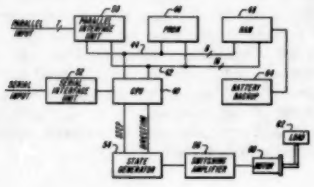
means for tracking and holding the amplitude of the difference signal at a third time between said first and second times in each successive frame sample time following the first frame sample time.

4,714,867

METHOD AND APPARATUS FOR CONTROLLING A STEPPER MOTOR WITH A PROGRAMMABLE PARABOLIC VELOCITY PROFILE

Simyon Palmin, Sharon, and Vladimir Shlain, Brookline, both of Mass., assignors to Design Components Incorporated, Franklin, Mass.

Filed Sep. 30, 1986, Ser. No. 913,537
Int. Cl.[4] H02P 8/00
U.S. Cl. 318—696 16 Claims



1. A method for controlling a stepper motor comprising:

supplying to the stepper motor a series of electrical pulses of suitable amplitude and pulse width to advance the stepper motor; and

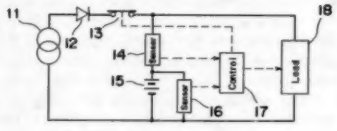
controlling the times between said pulses to provide a parabolic stepper motor velocity profile between a start/stop velocity V_0 at a time t=0 and a maximum velocity V_m at a time t=T.

4,714,868

CHARGING AND DISCHARGING CONTROL CIRCUIT FOR A STORAGE BATTERY

Toshio Maruyama; Noriaki Shibuya, and Yukihiko Nakata, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 3, 1985, Ser. No. 783,565
Claims priority, application Japan, Oct. 4, 1984, 59-209449
Int. Cl.[4] H02J 7/00
U.S. Cl. 320—5 6 Claims



1. A charging and discharging control circuit for a storage battery, comprising:

charging control means for detecting a voltage across said storage battery and disabling the charging of said battery when said voltage reaches a first predetermined level; and

discharging control means for detecting the total amount of voltage discharged from said battery and disabling the discharging of said battery when said total amount of voltage reaches a second predetermined level,

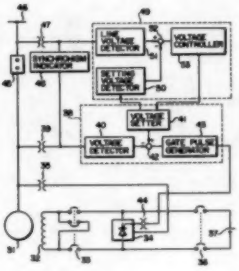
said charging control means resetting said discharging control means simultaneously with the disabling of said charging of the storage battery.

4,714,869

EXCITATION CONTROL APPARATUS FOR SYNCHRONOUS MACHINE

Naganori Onitsuka, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 7, 1986, Ser. No. 882,393
Claims priority, application Japan, Jul. 10, 1985, 60-150115
Int. Cl.[4] H02P 9/30
U.S. Cl. 322—20 4 Claims



1. An excitation control apparatus for controlling an excitation of a synchronous machine comprising:

voltage setting means for previously generating an output voltage equal to a rated output voltage of a synchronous machine;

voltage control means for controlling the output voltage of said voltage setting means so that the output voltage thereof becomes equal to a voltage of a line at a time when said synchronous machine is started;

first voltage detecting means for detecting an output voltage of said synchronous machine; and

voltage adjusting means for automatically controlling an excitation current of the synchronous machine after the synchronous machine has been started so that the output voltage of the synchronous machine becomes equal to the ouput voltage of the line.

4,714,870

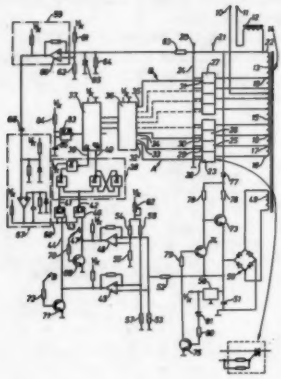
ARRANGEMENT FOR CONTROLLING AN A.C. VOLTAGE

Alf B. Nilsson, Malmö, Sweden, assignor to Aktiebolaget Electrolux, Sweden

Filed Oct. 23, 1986, Ser. No. 922,337
Claims priority, application Sweden, Nov. 7, 1985, 8505272
Int. Cl.[4] G05F 1/20
U.S. Cl. 323—258 4 Claims

1. In an arrangement for controlling on A.C. voltage for supplying a load wherein the load is connected to the secondary winding of a transformer, the primary winding of the transformer has a number of taps which are selectively connectable to an external A.C. voltage source, an electronic control device is responsive to the magnitude of the terminal voltage of the external A.C. voltage source for stepwise connecting the different taps automatically to thereby connect that tap which causes the voltage supplied to the load to be of a predetermined value, the electronic control device comprising controllable two-way electronic switches, the number of which corresponds to the number of said taps, the improvement wherein the electronic control device further comprises means connected to control the operation of the electronic control device so as to close the switch to be activated next before the switch then conducting is opened whereby the last

two mentioned switches are only momentarily closed at the same time to short circuit a portion of the secondary winding



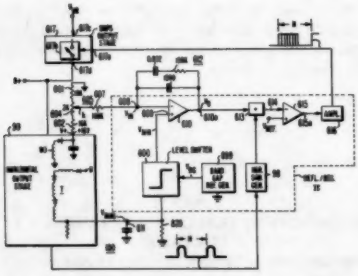
and the phase shift between the voltage and current therein is momentarily eliminated.

4,714,871

LEVEL SHIFTER FOR A POWER SUPPLY REGULATOR IN A TELEVISION APPARATUS

Jack Craft, Bridgewater; Michael L. Low, Dover, and Bernard J. Yorkanis, S. Plainfield, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Dec. 18, 1986, Ser. No. 943,187
Int. Cl.[4] G05F *3/20*
U.S. Cl. 323—315 **19 Claims**



1. A power supply that includes a level shifter that level shifts an input voltage that controls an output voltage of said power supply, comprising:

a source of supply voltage;

a controllable conductive element coupled to said supply voltage for generating therefrom said output voltage;

means, including a comparator, coupled to said conductive element for varying, in accordance with an output signal of said comparator, the conduction of said conductive element to control said output voltage;

a current mirror arrangement including a transistor and responsive to a current in a first circuit branch for generating a current in a first main current conducting electrode of said transistor that is the current mirror of said current in said first circuit branch, said first main current conducting electrode being coupled at a junction terminal to a second circuit branch for conducting at least a portion of a current in said second circuit branch;

a source of said input voltage coupled to said transistor for varying said current in said first main current conducting electrode to produce a current that varies in accordance with said input voltage and that is related to a difference between said current in said first main current conducting electrode and said current in said second circuit branch;

a first resistance coupled to said junction terminal for conducting said difference related current to develop a voltage thereacross that varies in accordance with said input voltage; and

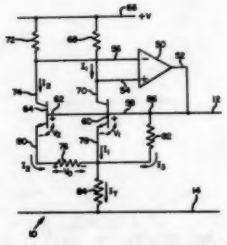
a source of temperature compensated first voltage coupled via said first resistance to said junction terminal such that said voltage across said resistance is combined with said first voltage for developing a temperature compensated second voltage at said junction terminal that varies in accordance with said input voltage and that is level shifted in accordance with said first voltage, said temperature compensated, level shifted, second voltage being coupled to an input of said comparator for varying said output signal of said comparator in accordance therewith to control said output voltage.

4,714,872

VOLTAGE REFERENCE FOR TRANSISTOR CONSTANT-CURRENT SOURCE

Einar O. Traa, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 10, 1986, Ser. No. 884,119
Int. Cl.[4] G05F *3/20*
U.S. Cl. 323—314 **12 Claims**



1. In an electrical circuit that includes a first semiconductor device which has a first junction of semiconductor materials characterized by a temperature-varying conduction voltage and which receives an applied voltage to provide at a particular temperature a constant current flow across the first junction, a method of developing an applied voltage that maintains a substantially temperature-invariant constant current flow across the first junction, comprising:

selecting a second semiconductor device which has a second junction characterized by a temperature-varying conduction voltage which is substantially the same as that of the first junction of the first semiconductor device;

developing from the second semiconductor device a first current component which changes in direct proportion to the temperature-varying conduction voltage of the second junction;

developing from the second semiconductor device a second current component which flows across the second junction and which changes in direct proportion to the temperature-varying conduction threshold voltage of the second junction;

proportioning and summing the first and second current components to provide a composite current which remains substantially constant independent of temperature;

developing a constant voltage which is proportional to the composite current; and

forming the applied voltage as the sum of the constant voltage and the temperature-varying conduction voltage of the second junction, thereby to provide an applied voltage

having a temperature-varying component that compensates for temperature variations in the voltage of the first semiconductor device and a constant voltage component that causes the first semiconductor device to maintain constant current flow across the first junction.

4,714,873

MICROWAVE NOISE MEASURING APPARATUS

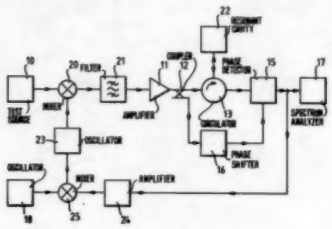
Hugh McPherson, Tweeddale, and Jeffrey Stoker, Edinburgh, both of Scotland, assignors to Ferranti, plc, Cheadle, England

Filed Aug. 19, 1986, Ser. No. 897,800

Claims priority, application United Kingdom, Aug. 23, 1985, 8521184

Int. Cl.[4] G01R *23/16*; G01S *7/40*

U.S. Cl. 324—57 N **6 Claims**



1. Apparatus for measuring the phase noise content of the output of a microwave signal source, which includes a microwave cavity resonant at a fixed frequency differing from that of the source by between 1% and 10% of the cavity resonant frequency, signal generating means operable to generate a signal representing the difference between the frequency generated by the microwave signal source and the resonant frequency of the cavity, mixing means operable to combine the outputs of the microwave signal source and of the signal generating means to provide a signal having a frequency equal to the resonant frequency of the cavity for application thereto, and phase detector means responsive to an output from the cavity and to an output from the mixing means in phase quadrature therewith to provide a signal representing the phase noise content of the output of the microwave signal source.

4,714,874

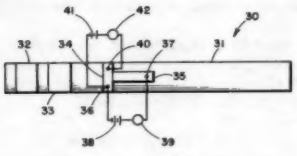
TEST STRIP IDENTIFICATION AND INSTRUMENT CALIBRATION

James R. Morris, South Bend, and James A. White, Elkhart, both of Ind., assignors to Miles Inc., Elkhart, Ind.

Filed Nov. 12, 1985, Ser. No. 797,214

Int. Cl.[4] G01R *27/02*; G01N *21/78*

U.S. Cl. 324—65 R **2 Claims**



1. A method for identifying a reagent test device having an electrically conductive region and calibrating a reagent test device measuring instrument for the identified reagent test device comprising

contacting a conductive region of a reagent test device in a first location with electrical probes to make a first resistance or conductance measurement signal,

contacting the same or a different conductive region of said reagent test device in a second location with electrical probes to make a second resistance or conductance measurement signal,

ratioing the first and second measurement signals, and

transmitting the ratioed signals to an instrument, thereby identifying the reagent test device and calibrating said instrument.

4,714,875

PRINTED CIRCUIT BOARD FAULT LOCATION SYSTEM

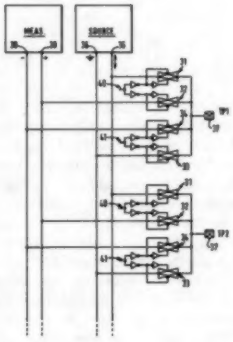
John W. Bailey; Paul A. Hayter; Brian R. Mason, and Graham N. Turner, all of Berkshire, England, assignors to Mars, Inc., McLean, Va.

Filed Apr. 12, 1985, Ser. No. 722,406

Claims priority, application United Kingdom, Apr. 16, 1984, 8409794; Mar. 29, 1985, 8508319

Int. Cl.[4] G01R *31/28, 31/02*

U.S. Cl. 324—73 PC **21 Claims**



1. A fault location system for testing the viability of components on a printed circuit board under test, said system comprising an array of bidirectionally current conducting analog switching networks each of said switching networks connected to a test point suitable for connection to a node of said printed circuit board, a stimulus source means for selective application of stimuli to components on said printed circuit board, a measurement facility selectively connectable to enable the response of components on said printed circuit board to said stimuli to be measured, means for establishing a source of reference potential, and control means arranged to control the switching networks so as selectively to connect said test points either to said stimulus source or to said reference potential source and simultaneously also to a corresponding input of said measurement facility, said switching networks each comprising four bidirectionally current conducting solid-state analog switches each having a control electrode addressable by said control means for determining the current conduction condition of the respective switch, a first of said switches in each said switching network having its current conduction path connected between a terminal of said stimulus source and the respective test point and its control electrode connected to a first selection terminal of the control means, a second of said switches in each said switching network having its current conduction path connected between said test point and a terminal of said reference potential source and its control electrode connected to a second selection terminal of the control means, a third of said switches in each said switching network having its current conduction path connected between said test point and a first terminal of said measurement facility and its control electrode connected to a third selection terminal of the control means, and a fourth of said switches in each said switching network having its current conduction path connected between said test point and a second terminal of said measure-

ment facility and its control electrode connected to a fourth selection terminal of the control means.

4,714,876

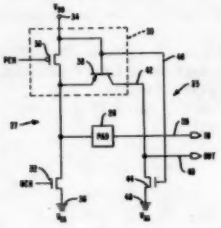
CIRCUIT FOR INITIATING TEST MODES

Richard B. Gay, and Harold S. Crafts, both of Fort Collins, Colo., assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 14, 1986, Ser. No. 851,620

Int. Cl.[4] G01R *17/02*

U.S. Cl. 324—73 R 4 Claims



1. In an input/output circuit having a p-channel output driver transistor, an n-channel output driver transistor and a pad connected between the p-channel output driver transistor and the n-channel output driver transistor, said pad for receiving signals to be inputted into said input/output circuit and for being driven by the n-channel output driver transistor and the p-channel output driver transistor for providing output signals, said p-channel output driver transistor formed on an n-type substrate and having its source connected to a reference terminal for receiving a reference voltage, its drain connected to the pad, and its gate for receiving output drive signals, means for adding a function to the input/output circuit comprising:

a parasitic PNP transistor having its emitter formed by the drain of said p-channel output driver transistor, its base formed by the substrate of said p-channel output driver transistor for providing an emitter-base junction, and its collector formed by a p-diffusion in said substrate, said collector controlled by said emitter-base junction such that current flows therethrough when a voltage is applied to said pad which is sufficient to forward bias said emitter-base junction, and does not flow when said emitter-base junction is reversed biased;

a load device connected to said collector for providing an electrical load when said emitter-base junction is forward biased; and

a conductor connected intermediate said collector and said load device for providing an added function voltage of a first level when said emitter-base junction is forward biased, and for providing an added function voltage of a second level when the enabling voltage applied to said pad is not sufficient to forward bias said emitter-base junction.

4,714,877

THREE-VOLTAGE LEVEL DETECTOR FOR INDICATING A HIGH LEVEL, MID-LEVEL OR LOW LEVEL VOLTAGE

Samuel K. Kong, Union City, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 2, 1985, Ser. No. 803,467

Int. Cl.[4] G01R *19/14*

U.S. Cl. 324—133 16 Claims

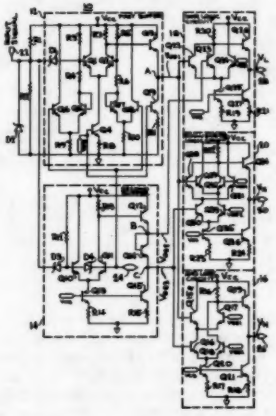
1. A three-voltage level detector comprising:

input means for receiving at an input terminal of the detector an input logic signal having either a high level, mid-level or low level voltage;

first level sensing buffer means responsive to said input logic signal for generating a first output sense voltage indicative of whether said input logic signal is either at the (a) high level voltage or (b) mid-level or low level voltage;

said first sensing means including a differential amplifier formed of first and second bipolar transistors having their emitters coupled together, said first transistor defining an input transistor and having its base coupled to said input logic signal, said second transistor defining a reference transistor and having its base coupled to a first sensing voltage;

second level sensing means responsive to said input logic signal for generating a second output sense voltage indicative of whether said input logic signal is either at the (a) high level or mid-level voltage or (b) low level voltage;



first logic means responsive to said first and second output sense voltages for generating at a first output terminal of the detector a first output signal being in a high level only when said input logic level is at the high level voltage;

second logic means responsive to said first and second output sense voltages for generating at a second output terminal of the detector a second output signal being in a high level only when said input logic level is at the low level voltage; and

third logic means responsive to said first and second output sense voltages for generating at a third output terminal of the detector a third output signal being in a high level only when said input logic level is at the mid-level voltage.

4,714,878

APPARATUS FOR FORMING THE ACTUAL VALUE OF A TORQUE IN A THREE-PHASE SYNCHRONOUS MACHINE WITH CURRENT-BLOCK FEEDING

Rolf-Jürgen Steinigeweg, Herzogenaurach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 18, 1986, Ser. No. 840,697

Claims priority, application Fed. Rep. of Germany, May 6, 1985, 3516208

Int. Cl.[4] G01L *3/00;* H02P *5/00*

U.S. Cl. 324—158 MG 6 Claims

6. An apparatus for forming an actual value of a torque exerted in a three-phase synchronous machine, said synchronous machine having current-block finding wherein three a-c current signals are fed to respective windings of said synchronous machine, each of said signals taking the form of a positive rectangular waveform having pulses interleaved in time with pulses of a negative rectangular waveform, each pulse of one of the waveforms being spaced in time from each adjacent pulse of the other of said waveforms by 60° of an operating cycle of said synchronous machine, each of said signals being staggered in time with respect to the other two of said signals

by 120° of the operating cycle of said synchronous machine, the pulses of said waveforms having leading and trailing edges whose current levels change in finite amounts of time, said apparatus comprising:

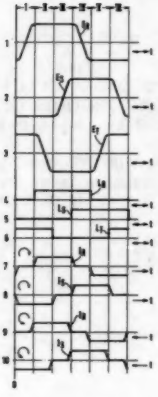
first generating means for producing a first measurement signal proportional to the current of one of the a-c current signals;

second generating means for producing a second measurement signal proportional to the current of another of said a-c current signals;

first inverter means connected to said first generating means for generating a first inverted signal equal in magnitude and opposite in polarity to said first measurement signal;

second inverter means connected to said second generating means for generating a second inverted signal equal in magnitude and opposite in polarity to said second measurement signal;

switching means operationally linked to said first and said second generating means and to said first and said second



inverter means for selectively transmitting said first and said second measurement signal and said first and said second inverter signal;

adding means operatively coupled to said switching means for generating sums of signals transmitted therefrom;

third generating means responsive to rotation of a rotor of said synchronous machine for producing a plurality of signals containing information as to the leading and trailing edges of the pulses of the a-c current signals; and

control means operatively tied to said switching means and said third generating means for operating said switching means at the beginnings of six equispaced time intervals during the operating cycle of said synchronous machine to transmit to said adding means one of said first and said second measurement signal and said first and said second inverted signal during four of said time intervals and to transmit to said adding means one of said first measurement signal and said first inverted signal and one of said second measurement signal and said second inverter signal during the other two of said time intervals.

4,714,879

HOLDING AND TESTING DEVICE FOR ELECTRONIC MODULES WITHIN FLAT CARRIERS

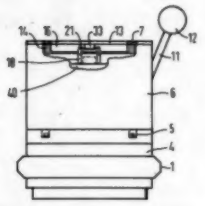
Bernd Krause, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 17, 1986, Ser. No. 908,238

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1985, 3533658

Int. Cl.⁴ G01R *31/02, 1/04*

U.S. Cl. 324—158 F **19 Claims**



1. A holding and testing device for electronic modules having terminal legs lying in a single plane for connection to a test installation, the electronic modules being mounted in flat carriers having openings for positional fixing, comprising:

a movable plate;

an arrangement of spring contacts on said movable plate for conductive connection between individual terminal legs of a module and the test installation;

fixing pins extending from said movable plate for engagement with said openings in said flat carriers;

guide pins having beveled free ends and extending from said movable plate parallel to and in the same direction as said arrangement of spring contacts;

a perforate plate including a receptacle formed as a trough for said flat carrier, said perforate plate being above said movable plate and including clearances corresponding to individual ones of said spring contacts and to said fixing pins and to said guide pins;

said spring contact arrangement being displaceable relative to said receptacle;

said fixing pin in an initial latched position having free ends projecting through said clearances in said perforate plate and engaging said openings of said flat carrier in said receptacle trough;

first and second horizontally displaceable slides in said perforate plate and including at least one engagement opening in each slide for said guide pins;

each of said guide pins having a tip lying against the edge of a respective one of said engagement openings when in an initial latched position so that said first and second slides are horizontally movable toward one another upon vertical displacement of said guide pins;

laterally extending tongues affixed to said first and second slides and extending over said flat carrier when said slides are horizontally displaced to fix the electronic module in position in combination with said fixing pins; and

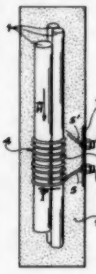
said movable plate being movable into a latched test position wherein said spring contacts produce electrical connections to individual terminal legs of the electronic module.

4,714,880

WIDE FREQUENCY PASS BAND MAGNETIC FIELD DETECTOR

Paul Charmet, Montlhery, France, assignor to Commissariat a l'Energie Atomiques, Paris, France

Filed Jun. 5, 1986, Ser. No. 870,872
Claims priority, application France, Jun. 7, 1985, 85 08665
Int. Cl.[4] G01R *33/02*; H01F *17/04*
U.S. Cl. 324—258 **9 Claims**



1. A magnetic field detector comprising:

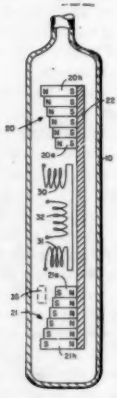
at least one bar of a ferromagnetic material about which are wound in a single layer several loops of a conductive coaxial cable which is cut at a point midway between the two ends of said cable into half-portions including a first portion and a second portion wherein said first and second portions are connected in such a way that the sheath of the first portion is connected to the core of the second portion and the sheath of the second portion is conpected to the core of the first portion, each of said ends of the cable being used for measuring an output voltage of the detector, said voltage being indicative of a magnetic field to be detected.

4,714,881

NUCLEAR MAGNETIC RESONANCE BOREHOLE LOGGING TOOL

Wyatt W. Givens, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 15, 1986, Ser. No. 885,634
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—303 **6 Claims**



1. A nuclear magnetic resonance borehole logging tool comprising:

(a) an elongated logging sonde,

(b) a first array of magnets positioned within said sonde and polarized in a direction perpendicular to the longitudinal axis of said sonde,

(c) a second array of magnets positioned within said sonde at an axially spaced-apart position from said first array and polarized in a direction perpendicular to the longitudinal axis of said logging sonde such that it is 180° out-of-phase with the polarization of said first array,

(d) magnetic material positioned within said logging sonde in juxtaposition with a first set of common poles of the magnets of said first array,

(e) magnetic material positioned within said logging sonde in juxtaposition with a second set of common poles of the magnets of said second array which are of opposite polarity to that of said first set of common poles, and

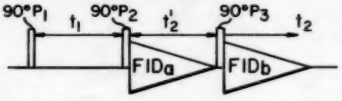
(f) means for positioning and orienting said logging sonde against the wall of a borehole such that said first and second arrays are in juxtaposition with the borehole wall and said magnetic material is between both said first set of common poles of said first array and said second set of common poles of said second array and the borehole fluid, whereby the magnetic lines of induction between said first and second arrays travel outward into the formation surrounding the borehole to create a homogeneous static magnetic field parallel to the axis of the borehole and travel inward through said magnetic material to create a weaker static magnetic field in the direction of said borehole fluid.

4,714,882

TWO-DIMENSIONAL NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY METHOD

Kuniaki Nagayama, Tokyo, Japan, assignor to JEOL, Ltd., Tokyo, Japan

Filed Nov. 18, 1985, Ser. No. 799,128
Claims priority, application Japan, Dec. 14, 1984, 59-263988
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—307 **4 Claims**



1. A two-dimensional nuclear magnetic resonance spectroscopy method comprising the steps for:

(a) applying a pulse train consisting of at least three RF pulses having the same phase to a nucleus to be observed, the pulses containing the resonance frequency of the nucleus, then detecting free induction decay signal FIDa emanating from the nucleus during interval t_2' between the second and third pulses of the pulse train, detecting free induction decay signal FIDb emanating from the nucleus during interval t_2 subsequent to the third pulse of the pulse train, and storing these two signals in first and second data files, respectively;

(b) repeating the step (a) above N times while putting at least one of the three pulses of the pulse train out of phase with the others, storing the free induction decay signals FIDa and FIDb obtained by each measurement in their respective data files;

(c) repeating the steps (a) and (b) with different values of the interval t_1 between the first and second pulses of the pulse train;

(d) forming a linear combination of data items stored in the data files assigned either to the free induction decay signals FIDa or to FIDb; and

(e) subjecting the formed data to double Fourier transformation with respect to t_2 or t_2' and t_1.

4,714,883

METHOD AND APPARATUS FOR OBTAINING LOCALIZED NMR SPECTRA

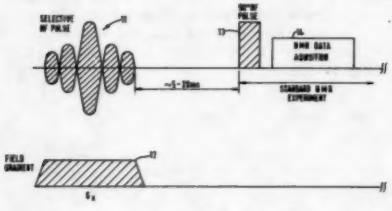
Roger Ordidge, Eynsham, England, assignor to Oxford Research Systems Limited, Eynsham, England

Filed Jun. 18, 1985, Ser. No. 746,191

Claims priority, application United Kingdom, Jun. 21, 1984, 8415852; Mar. 13, 1985, 8506457

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 17 Claims



1. A method of obtaining an NMR spectrum from a first region lying wholly within a second region of a sample material, which method comprises obtaining a signal indicative of a first NMR spectrum from substantially all of the second region of the sample material, applying to the sample a magnetic field gradient, and simultaneously applying to the sample an Rf perturbing pulse having an amplitude and a frequency distribution such as to perturb nuclear spins in the said first region, but not outside it, removing the magnetic field gradient, and thereafter obtaining from the sample a signal indicative of a second NMR spectrum before relaxation of the perturbed spins in the said first region, and comparing the said first and second signals to obtain a difference spectrum attributable to the said first region.

4,714,884

METHOD OF ELIMINATING EFFECTS OF SPURIOUS NMR SIGNALS CAUSED BY IMPERFECT 180 DEGREE RF PULSES

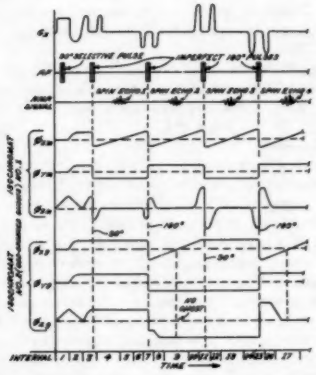
Gary H. Glover, Delafield, Wis., assignor to General Electric Company, Waukesha, Wis.

Continuation of Ser. No. 873,797, Jun. 13, 1986, abandoned.

This application Apr. 27, 1987, Ser. No. 47,554

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 31 Claims



1. In an NMR imaging method employing multiple spin-echo pulse sequences, a method for eliminating ghosting artifacts in an NMR image comprising the steps of:

maintaining a static magnetic field along a first axis of an NMR imaging sample;

exciting a plurality of nuclear spins in a region of said NMR sample by irradiating said sample with an RF pulse;

irradiating said NMR sample with a series of 180° RF pulses such that each RF pulse inverts the orientation of a first group of said excited nuclear spins by 180°, whereupon inherent imperfections in at least one of said 180° pulses cause a second group of said excited nuclear spins to change orientation by an angle other than 180°;

applying first and second magnetic field gradient pulses to the NMR sample before and after, respectively, the application of at least one of the 180° RF pulses thereby causing no net accumulation of phase in the first group of excited nuclear spins;

applying an imaging gradient after said at least one 180° RF pulse in order to focus said plurality of nuclear spins and thereby create an NMR spin-echo signal;

sampling said NMR signal during a predetermined time interval between 180° pulses in order to detect said spin-echo signal; and

modulating each pair of first and second magnetic field gradients with respect to other pairs associated with said series of 180° RF pulses in order to prevent refocusing of said second group of nuclear spins for the duration of all of said time intervals during which the NMR signal from the sample is detected for the purpose of constructing an image.

4,714,885

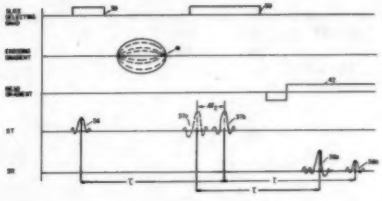
MAGNETIC RESONANCE IMAGING

Zvi Paltiel, Rehovot, and Amir Ban, Tel Aviv, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed Aug. 4, 1986, Ser. No. 892,105

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—312 9 Claims



1. A method of magnetic resonance imaging for obtaining data contributions of first and second spectral components from a subject using a single magnetic resonance scan, said method comprising the steps of:

(a) using a scan sequence that separates echo signals from said first and second spectral components by 90 degrees and provides a resultant echo signal and the phase angle β between the resultant echo signals and a horizontal axis of a cartesian co-ordinate system;

(b) determining the angle α between the horizontal axis and the echo signal of said first spectral component; and

(c) subtracting the angle α from the angle β to rotate the resultant echo signals so that the first and second spectral components align with the horizontal and vertical axes of the cartesian co-ordinate system respectively.

4,714,886

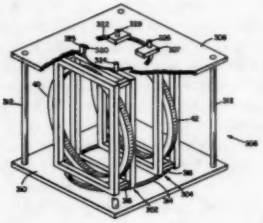
MAGNETIC RESONANCE ANALYSIS OF SUBSTANCES IN SAMPLES THAT INCLUDE DISSIPATIVE MATERIAL

Howard J. Halpern, Chicago, Ill., assignor to President and Fellows of Harvard College, Cambridge, Mass.

Filed Jul. 16, 1985, Ser. No. 755,666

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—316 **23 Claims**



1. Magnetic resonance apparatus for deriving data representative of an image of the distribution of a predetermined substance within a sample, comprising

means for establishing a magnetic field within said sample,

means for stimulating magnetic resonance within said sample to produce a magnetic resonance signal indicative of said distribution of said predetermined substance, and

means for detecting said resonance signal and deriving said data representative of said image from said resonance signal,

said means for establishing a magnetic field comprising a pair of coils that are positioned respectively on opposite sides of said sample and are splayed relative to each other to generate a magnetic field gradient along an axis of said sample, each said coil being substantially ring-shaped and lying substantially in a plane.

4,714,887

NUCLEAR MAGNETIC RESONANCE TOMOGRAPHY APPARATUS

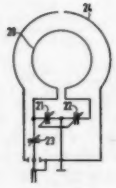
Ralph Meissner, Erlangen, and Walter Popp, Emskirchen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 8, 1986, Ser. No. 849,404

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515190

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—322 **10 Claims**



1. A nuclear magnetic resonance tomography apparatus for representing internal regions of an examination subject comprising:

means for generating a fundamental magnetic field in which said examination subject is disposed;

means for generating a plurality of selected gradient magnetic fields in which said examination subject is disposed;

means for exciting nuclear spins in said examination subject; and

a surface coil for acquiring signals corresponding to the displacement of said nuclear spins from an equilibrium position having a ring with free ends connected to ground through respective capacitances and a high-frequency shielding at least partially covering said ring, said shielding having a gap aligned with a center of said ring and symmetrically completely dividing said shielding.

4,714,888

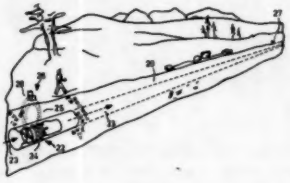
APPARATUS FOR OBSERVING THE PASSAGE OF A PIG IN A PIPELINE

Hartley A. French, 67 Aldershot Crescent, Willowdale, Ontario, Canada L2P 1L7, and Anthony C. Richardson, 2679 Midland Ave., Agincourt, Ontario, Canada M1S 1R8

Filed Jun. 11, 1984, Ser. No. 619,256

Int. Cl.[4] G01V *3/08*; G01R *33/02*; G08B *5/00*

U.S. Cl. 324—326 **18 Claims**



1. Apparatus for observing the passage of a pig in a pipeline which comprises sensor means responsive to a change in ambient magnetic field resulting from the passage of a pig, control means operable by said sensor means, visual signal means movable between a ready position and an operative position and resettable holding means for holding said signal means in said ready position, said sensor means including a movable element which is physically displaced by said change in ambient magnetic field resulting from the passage of a pig, said control means including monitoring means for monitoring physical displacement of said movable element, said monitoring means producing a control signal upon the passage of a pig and means for applying said control signal to said holding means to cause said holding means to release said signal means to move from the ready position to the operative position.

4,714,889

METHOD OF INTERPRETING IMPEDANCE DISTRIBUTION OF AN EARTH FORMATION USING PRECURSOR LOGGING DATA PROVIDED BY A MULTI-ELECTRODE LOGGING ARRAY STATIONARY WITHIN A BOREHOLE

Carroll W. Chapman, Anaheim, and Jorg A. Angehrn, Brea, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jul. 31, 1985, Ser. No. 761,123

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.[4] G01V *3/18*

U.S. Cl. 324—366 **21 Claims**

1. Method of synthesizing the true response characteristics of a combination of different hole-centered electric logging tools in a variety of difficult borehole conditions as provided by (1) determining impedance values of an earth formation penetrated by a borehole filled with a drilling mud of resistivity (Rm), and forming impedance matrices with said impedance values, and (2) selectively manipulating the impedance values so as to synthesize operations of different hole-centered tools over an associated depth increment with surprising accuracy, wherein each of said impedance matrices is associated with a matrix gather indexed to one of a series of finite, overlapping depth scan increments of the formation measured along the borehole, each scan increment being dependent on the array length L of an electrode array to define shallow and deep depth markers as well as being centrally indexed to the

depth in the borehole of a mid-central electrode assembly of the array at the time of data collection, and thereby provide a true indication of the formation resistivity (Rt) even though the formation is interspaced from the borehole by an invaded zone of resistivity (Rxo) of unknown lateral extent due to drilling mud filtrate invasion, comprising the steps of:

(i) calibrating an array of hole centered M electrode assemblies of equal incremental electrode spacing "a" to obtain sets of calibration factors normalized to known current and voltage patterns in a known resistivity zone of response, said electrode assemblies having a known internally ordered numbering index, and each comprising a current electrode and a potential electrode, said sets of calibration factors each being addressable as a function of borehole conditions including said difficult borehole conditions as well as by particular synthetic computer focused array type;

(ii) positioning the array in the borehole, wherein the absolute depth of at least one electrode assembly is known with respect to a predetermined depth datum level measured from the earth's surface;

(iii) while the array is substantially stationary within the borehole, injecting current from each of said electrode assemblies—one at a time—into the adjacent formation;

(iv) at each occurrence of current injection, measuring the absolute potential at a common electrode assembly and the potential differences between adjacent pairs of assemblies as a function of internal indexing numbers of active current and potential sensing electrodes of the assemblies used in the measurements;

(v) advancing the array along the borehole an incremental distance equal to the electrode assembly spacing "a" between adjacent assemblies and repeating steps (iii) and (iv), again with the array being substantially stationary within the borehole:

(vi) re-repeating steps (iii)–(v) until the collection of all current and potential data has been completed;

(vii) calculating impedance values from the measured absolute and difference potential values and their associated injected currents, each value being indexed to said known internal indexing numbers of active current and potential electrodes used in the measurements;

(viii) reindexing the impedance values into impedance entries of a series of overlapping modified matrix gathers, each gather being associated with a predetermined zone of said formation coincident with depth of the mid-central assembly as the steps (iii) and (iv) occur, and comprising M×M impedance entries where M is the largest internal indexing number of the array and in which the ratio of the number of difference impedance entries to absolute entries is about M−1:1 whereby each M×M matrix gather is surprisingly useful in deducing true resistivity of the formation even in the presence of high true resistivity to mud resistivity contrasts and irrespective of whether or not synthetic sets of potential or sets of current values are later used as initiators of subsequently generated responses of computer focused synthetic tool arrays;

(ix) inverting each modified matrix gather to form inverted modified matrix gathers;

(x) generating computer focused response parameters using the same current and voltage patterns of step (i) and based on said inverted modified impedance matrix gathers; and

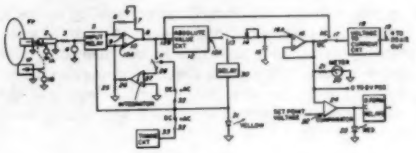
(xi) searching sets of calibration factors of step (i) until the product of a particular set and the response parameters of step (x) for all synthetic tool array types is essentially a constant whereby the difficult borehole condition is deduced even in the presence of high true resistivity to mud resistivity contrasts and irrespective of the fact that synthetic sets of potential patterns have benn used as initiators of the subsequently generated computer focused response parameters.

4,714,890

FLOW MEASURING APPARATUS WITH ANALOG, ESSENTIALLY LINEAR OUTPUT

Ronald L. Dechene, Boxford, and Robert E. Newton, Tewksbury, both of Mass., assignors to Auburn International, Inc., Danvers, Mass.

Filed Oct. 9, 1984, Ser. No. 658,587
Int. Cl.[4] G01R *27/60*
U.S. Cl. 324—454 **1 Claim**



1. Flow measuring apparatus for determining quantitatively, in a linear, analog reading, available in real time, the flow rate of a solid particle containing fluid moving in a conduit comprising, in combination,

(a) triboelectric sensor electrode means in said conduit constructed and arranged in the flow stream in said conduit for a physical charge transfer from said particles in the flow to said electrode means where said charge transfer rate is proportional to said flow rate,

(b) means for establishing a directly coupled ground path for said electrode means to conduct to ground such current as is produced at said electrode means through interaction with the flow stream,

(c) means for converting said current to a voltage signal,

(d) means for substantially continuously adjusting the zero of said voltage signal to compensate for zero drift essentially without desensitizing said voltage signal, and

(e) means for converting said voltage signal to an absolute value unipolar voltage at high output gain, said absolute value voltage being proportional to said flow rate, and

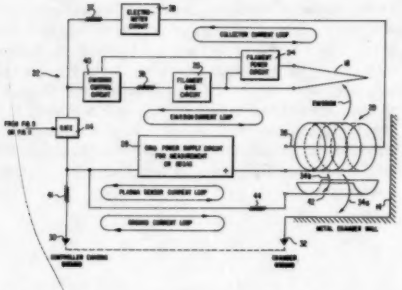
(f) means for applying said absolute value voltage to activate an output for adjusting the flow condition.

4,714,891

METHOD AND APPARATUS FOR IMPROVING THE SAFETY AND EXTENDING THE RANGE OF IONIZATION GAUGE SYSTEMS

Charles F. Morrison, Jr., Boulder, Colo., assignor to Granville-Phillips Company, Boulder, Colo.

Filed Sep. 23, 1985, Ser. No. 778,719
Int. Cl.[4] G01N *27/62*; H02H *3/00*
U.S. Cl. 324—459 **70 Claims**



1. In an ionization gauge system for measuring the pressure in a chamber, said system including a gauge including a filament, a grid, and a collector, controller circuitry for controlling current applied to said filament and a voltage applied to said grid, and electrometer circuitry for measuring the current through said collector to determine the chamber pressure where said controller circuitry, electrometer circuitry and said chamber are connected to a ground potential, the improvement comprising

means for sensing a ground current caused by plasma generated within said gauge and coupled to said chamber from said grid, said ground current flowing from the walls of said chamber to said ground potential and then from said ground potential through said controller circuitry to said grid; and

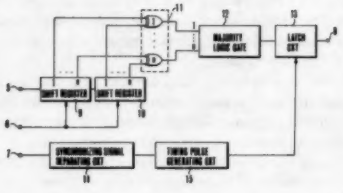
means responsive to said ground current sensing means for disabling said controller circuitry in response to the sensed ground current being substantially less than the ground current expected for a given chamber pressure to thereby detect an abnormality in the ground current and thus protect a human operator from such abnormality in the ground current.

4,714,892

DIFFERENTIAL PHASE SHIFT KEYING DEMODULATOR

Keiji Ishizuka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 25, 1986, Ser. No. 890,832
Claims priority, application Japan, Aug. 2, 1985, 60-169676
Int. Cl.[4] H04L *27/22*
U.S. Cl. 329—50 **11 Claims**



1. A differential phase shift keying demodulator, comprising:

(a) delay means for delaying a modulated signal;

(b) comparison means for comparing a signal produced from said delay means with said modulated signal;

(c) producing means capable of producing in parallel outputs of said comparison means which are related to said modulated signal obtained at different points of time within a transmission period for one bit of said modulated signal; and

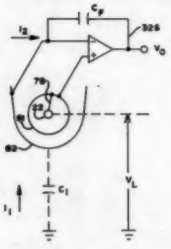
(d) output means for producing one demodulated signal based on all the outputs of said comparison means which are produced from said producing means.

4,714,893

APPARATUS FOR MEASURING THE POTENTIAL OF A TRANSMISSION LINE CONDUCTOR

William R. Smith-Vaniz, Darien and Richard L. Sieron, Fairfield, both of Conn., assignors to Niagara Mohawk Power Corporation, Syracuse, N.Y.

Division of Ser. No. 484,681, Apr. 13, 1983. This application Mar. 18, 1986, Ser. No. 841,092
Int. Cl.[4] G01R *15/06*, *1/30*
U.S. Cl. 324—126 **9 Claims**



1. Apparatus for measuring voltage on an above ground power line conductor comprising:

a generally toroidal shaped housing removably attached to said above ground conductor;

means for electrically connecting said housing to said conductor, whereby said housing and said conductor are at the same potential;

a metal plate mounted on the surface of said housing, said plate and said housing being separated by insulating material; and

said plate connected to said housing through a low impedance measuring means whereby said plate and said housing are at the same potential and whereby an equivalent capacitor is formed between said plate and ground;

said low impedance measuring means connected to said plate and said housing comprising an operational amplifier for measuring current equal to current in said equivalent capacitor, said current in said equivalent capacitor being proportional to the voltage on said power line conductor.

4,714,894

OPERATIONAL AMPLIFIER

Zdzislaw Gulczynski, 19 Greenhalge St., Medford, Mass. 02155

Filed Mar. 24, 1986, Ser. No. 843,165
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1985, 3510729
Int. Cl.[4] H03F *3/45*
U.S. Cl. 330—260 **5 Claims**

1. Operational amplifier for amplifying a signal applied to signal input terminals thereof, comprising:

two voltage followers providing equally polarized unidirectional output currents, each voltage follower having an input and an output terminal, and exhibiting an input offset voltage and an output impedance;

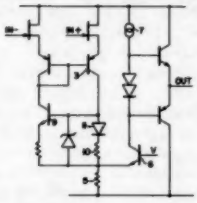
the signal input terminals being connected to the input terminals of the voltage followers;

a transistor having base, emitter and collector;

the output terminals of the voltage followers being connected across the base and the emitter of the transistor;

a current source exhibiting an output impedance and being coupled to the collector of the transistor;

a first amplifying means having an input and an output terminal and exhibiting an input offset voltage, for amplifying a voltage applied to the input terminal thereof;



the input terminal of the first amplifying means being connected to the collector of the transistor;

the output terminal of the first amplifying means providing an output signal of the operational amplifier; and

a second amplifying means exhibiting an input offset voltage and being connected to the collector and the base of the transistor, for amplifying the collector voltage thereof and providing a current to the base thereof.

4,714,895

INTERNAL ALL-DIFFERENTIAL OPERATIONAL AMPLIFIER FOR CMOS INTEGRATED CIRCUITS

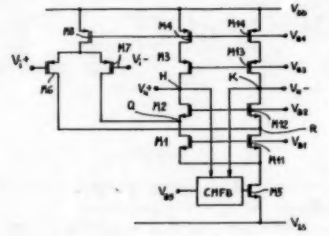
Germano Nicollini, Piacenza, Italy, and Daniel Senderowicz, Berkeley, Calif., assignors to SGS Microelettronica SpA, Catania, Italy

Filed Oct. 14, 1986, Ser. No. 918,101

Claims priority, application Italy, Oct. 14, 1985, 22475 A/85

Int. Cl.⁴ H03F *3/45*

U.S. Cl. 330—258 **6 Claims**



1. An internal all-differential operational amplifier for integrated circuits of the CMOS type, comprising two CMOS cascode circuits, identical to each other, each having a first and a second transistors with a channel having a first polarity and a third and fourth transistors with a channel having the opposite polarity, the drain of the first transistor being connected to the source of the second transistor, the drain of the fourth transistor being connected to the source of the third transistor, the drains of the second and of the third transistor being connected to each other and forming one of the output terminals of said amplifier, the sources of the first transistors of the two cascode circuits being both connected to the drain of a fifth transistor having said first polarity, the source of which is fed by a first supply voltage, and the sources of the fourth transistors of the two cascode circuits being fed by a second supply voltage, the two input signals being applied, by means of capacitor and switching means simulating input resistors, to the respective gates of said two first transistors, the other three gates of each cascode circuit being biased by respective fixed biasing voltages, the gate of the fifth transistor being biased by a dedicated fixed biasing voltage by means of capacitor and switching means constituting a common-mode feedback circuit.

4,714,896

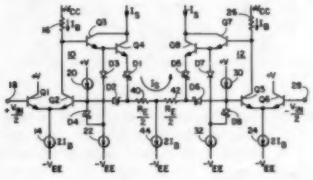
PRECISION DIFFERENTIAL AMPLIFIER HAVING FAST OVERDRIVE RECOVERY

John L. Addis, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 15, 1986, Ser. No. 919,112

Int. Cl.⁴ H03F *3/45*

U.S. Cl. 330—261 **1 Claim**



1. A differential amplifier having two identical halves, each half comprising:

a buffer amplifier input stage comprising an emitter coupled pair of transistors, wherein a base of a first transistor of said pair is coupled to an input terminal;

a primary feedback path, from collector to base of a second transistor of said pair, comprising Darlington-connected third and fourth transistors and a first and second diode; and

a secondary feedback path, from collector to base of said second transistor of said pair, comprising said third transistor and a third and fourth diode;

wherein only one of said primary and secondary feedback paths is operable with said buffer amplifier input stage at a time;

said halves being coupled together to form a differential amplifier wherein both said primary feedback paths conduct in a first operating condition, and wherein a secondary feedback path conducts in one of the halves in a second operating condition.

4,714,897

MONOLITHICALLY INTEGRATABLE SIGNAL AMPLIFIER STAGE WITH HIGH OUTPUT DYNAMICS

Bruno Murari, Monza; Mauro Pasetti, and Nazzareno Rossetti, both of Milan, all of Italy, assignors to SGS Microelettronica SpA, Agrate Brianza, Italy

Filed Dec. 17, 1985, Ser. No. 809,877

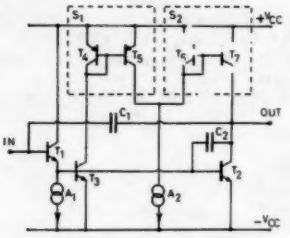
Claims priority, application Italy, Dec. 28, 1984, 24276 A/84

Int. Cl.⁴ H03F *3/04*

U.S. Cl. 330—288 **8 Claims**

1. A monolithically integratable signal amplifier stage comprising a first and a second semiconductor circuit element, each having a first and a second terminal and a control terminal, said control terminal of said first circuit element being an input terminal of said amplifier stage; wherein said second terminal of said first circuit element is connected to a first terminal of a supply voltage generator, and said first terminal of said first circuit element is coupled to both said control terminal of said second circuit element and, via a first constant current generator, to a second terminal of said supply voltage generator to which is also connected said first terminal of said second circuit element; said signal amplifier also comprising a third semiconductor circuit element having a first and a second terminal and a control terminal and at least a first and a second

current mirror circuit coupled to said first terminal of said supply voltage generator and each having an input and an output, said first terminal and control terminal of said third circuit element being respectively connected to said second terminal of said supply voltage generator and to said first terminal of said first circuit element, said input of said first current mirror circuit being connected to said second terminal



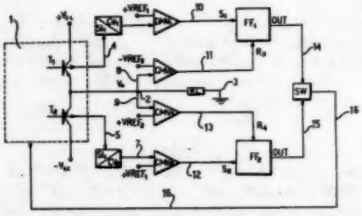
of said third circuit element, and said output of said first current mirror circuit and said input of said second current mirror circuit are both connected to said second terminal of said supply voltage generator via a second constant current generator and said output of said second current mirror circuit and said second terminal of said second circuit element are connected together so as to constitute an output terminal of said amplifier stage.

4,714,898

DEVICE FOR PROTECTING THE FINAL STAGE OF A POWER AMPLIFIER AGAINST SHORTING

Edoardo Botti, Mortara, and Fabrizio Stefani, Cardano al Campo, both of Italy, assignors to SGS Microelettronica S.p.A., Italy

Filed Jun. 6, 1986, Ser. No. 872,081
Int. Cl.[4] H03F *1/42*
U.S. Cl. 330—298 **3 Claims**



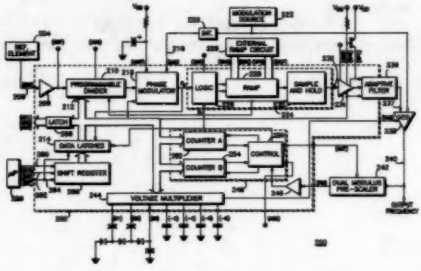
1. Apparatus for protecting the final stage of a power amplifier operating on a low voltage supply against shorting, the low voltage supply having a positive pole (+Vcc) and a negative pole (−Vcc), said final stage being of the push-pull type which comprises a first transistor (T_1) connected between the positive pole (+Vcc) of the supply voltage and a terminal of the load (RL), and a second transistor (T_2) connected between the negative pole (−Vcc) of the supply voltage and said terminal of the load (RL), another terminal of the load being grounded, characterized in that the apparatus comprises a first current sensor (SI_1) responsive to current flowing through the first transistor (T_1), and a second current sensor (SI_2) responsive to current flowing through the second transistor (T_2), respective first (CV_1) and second (CV_2) current-to-voltage converters issuing respective voltage signals (V_1, V_2) indicative of the current values sensed by said sensors (SI_1, SI_2), a first voltage comparator (CMV_1) for comparing said voltage signal (V_1) from the first converter (CV_1) with a first set reference positive voltage ($+VREF_1$), a second voltage comparator (CMV_2) for comparing said voltage signal (V_2) from the second converter (CV_2) with said set reference voltage ($+VREF_1$), said first and second voltage comparators being adapted to process and issue respective output signals (S_1, S_2) on either of said voltage signals (V_1 or V_2) exceeding said positive set reference voltage ($+VREF_1$), third (CMV_3) and forth (CMV_4) voltage comparators for comparing the instant value (V_o) applied to the load (RL) with the negative value and positive value, respectively, of a second set reference voltage ($VREF_2$), said third and fourth voltage comparators (CMV_3, CMV_4) issuing respective output signals (R_3, R_4) according to whether the instant absolute value of the voltage (V_o) applied to the load (RL) exceeds the absolute value of said second set reference voltage ($VREF_2$), a first bistable circuit (FF_1) to be activated by the output signals (S_1, R_3) from said first (CMV_1) and said third (CMV_3) voltage comparators, where both are provided, a second bistable circuit (FF_2) to be activated by the output signals (S_2, R_4) from said second (CMV_2) and said fourth (CMV_4) voltage comparators, and a change-over switch (SW) connected in circuit to the amplifier (1) and controlled by the output signals from either of said bistable circuits.

4,714,899

FREQUENCY SYNTHESIZER

Gary Kurtzman, No. Richland Hills; Joseph P. Heck, Fort Worth; Kenneth A. Hansen, Bedford, all of Tex.; Ralph Enderby, Sunrise, Fla., and Bronis Vidugiris, Arlington Heights, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 30, 1986, Ser. No. 913,426
Int. Cl.[4] H03L *7/06, 7/10*
U.S. Cl. 331—1 A **16 Claims**



1. A programmable frequency synthesizer, comprising:
means for providing a reference signal;
means for adaptively dividing said reference signal to provide a divided signal;
voltage controlled oscillator means for providing an output signal in response to a control signal;
means for simultaneously frequency modulating said output signal and said divided signal with an information signal to provide, respectively, a modulated output signal and a modulated divided signal, whereby the frequency synthesizer may be modulated down to approximately zero hertz;
prescaler means for dividing said modulated output signal to provide a scaled output signal;
means for comparing said modulated divided signal and said scaled output signal to provide a phase error signal;
means for adaptively filtering said phase error signal to provide said control signal;
means for controlling at least said adaptive divider means and said adaptive filtering means;
means for serially programming said control means,

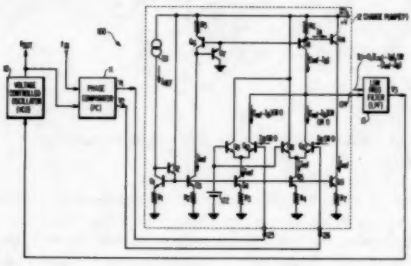
whereby, the frequency synthesizer may be rapidly reprogrammed.

4,714,900

CURRENT OUTPUT CIRCUIT HAVING WELL-BALANCED OUTPUT CURRENTS OF OPPOSITE POLARITIES

Hiroshi Sata, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 21, 1986, Ser. No. 933,511
Claims priority, application Japan, Nov. 21, 1985, 60-262805
Int. Cl.[4] H03L *7/00*
U.S. Cl. 331—8 **10 Claims**



1. A current output circuit comprising a plurality of input terminals receiving a plurality of input voltage signals, respectively, a reference current source generating a reference current, a plurality of first current-producing means coupled to said reference current source each for producing a first current having a first amplitude, an output terminal outputting an output current of a polarity determined by said input voltage signals, a plurality of switching means coupled between said first current-producing means and said output terminal, respectively, and having control terminals coupled to said input terminals, respectively, for switching paths of said first current therebetween in response to said input voltage signals at their control terminals, respectively, to supply to said output terminal an output current of a first polarity having one or more integer times of an amplitude which is said first amplitude of said first current minus a second amplitude of a current spended by one of said switching means, a second currentproducing means coupled to said reference current source for producing a second current having said first amplitude, a third current-producing means coupled to said reference current source for producing a third current having said second amplitude, and means coupled to said second and third current-producing means and to said output terminal for substracting said third current from said second current to supply to said output terminal an output current of a second polarity having an amplitude which is said first amplitude of said second current minus said second amplitude of said third current.

4,714,901

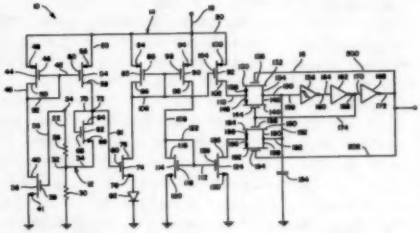
TEMPERATURE COMPENSATED COMPLEMENTARY METAL-INSULATOR-SEMICONDUCTOR OSCILLATOR

Babu L. Jain; Pardeep K. Jain, both of Santa Clara, and Michael S. Briner, San Jose, all of Calif., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Oct. 15, 1985, Ser. No. 787,813
Int. Cl.[4] G05F *3/24, 3/26;* H02J *1/04;* H03K *3/354*
U.S. Cl. 331—176 **19 Claims**

1. A temperature compensated metal-insulatorsemiconductor current source fabricated as a monolithic integrated circuit on a semiconductor die, comprising: means for receiving electrical energy; means for summing a temperature stable reference voltage and a threshold voltage to produce a bias voltage; and means for biasing a metal-insulator-semiconductor field effect transistor with a difference between said bias voltage and a temperature dependent voltage across a p-n semiconductor junction to generate a substantially temperature independent current through said metalinsulator-semiconductor field effect transistor.

9. A temperature compensated metal-oxide-semiconductor oscillator fabricated as a monolithic integrated circuit on a semiconductor die, comprising: means for receiving electrical energy; means for summing a temperature stable reference voltage and a threshold voltage to produce a bias voltage;



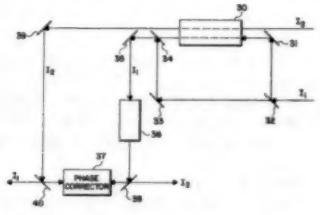
means for biasing a metal-oxide-semiconductor field effect transistor with a difference between said bias voltage and a temperature dependent voltage across a p-n semiconductor junction to generate a current through said metal-oxide-semiconductor field effect transistor which is substantially temperature independent; and means for producing an oscillating electrical signal receiving said substantially temperature independent current to be energized thereby, whereby said oscillating electrical signal has a substantially temperature independent period.

4,714,902

GASEOUS NON LINEAR DISPERSION LASER BEAM CONTROL

Mordechai Rokni, Mevasseret, Israel, and Allen M. Flusberg, Newton, Mass., assignors to AVCO Everett Research Laboratory, Inc., Everett, Mass.

Filed Jun. 17, 1985, Ser. No. 745,044
Int. Cl.[4] G02F *1/32;* G02B *6/36*
U.S. Cl. 332—7.51 **16 Claims**



1. In the method of controlling a laser beam the steps comprising:

(a) providing a gaseous medium comprising a mixture of a first gas and a buffer bas, said first gas being provided at about one thousandth of an atmosphere and having a first resonance transition and a second higher transition where both said transitions are allowed electric dipole transitions, said buffer gas being provided at about one tenth of at atmosphere and substantially collisionally broadening said first and second transitions of said first gas;

(b) maintaining said gaseous medium at "a pressure" said pressure whereby spectral broadening of the said first and second transitions is collision-dominated;

(c) causing a first controlling laser beam having a first wavelength to be incident on said gaseous medium, said first wavelength being at least near resonance with said first transition and inducing a predetermined nonthermal change in the refractive index of said gaseous medium at a second wavelength as a result of absorption by said first gas at said first transition and thereby producing an excited state of atoms in the absence of producing a thermal gradient; and

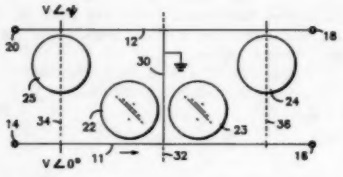
(d) causing a controlled laser beam having a predetermined wavelength to be incident on said gaseous medium, said predetermined wavelength being at least near said second wavelength and also at least near resonance with said second transition whereby said controlled laser beam sees said predetermined change in the refractive index produced by said nonthermal change in the said refractive index, the energy of said controlled laser beam being substantially greater than that of said controlling laser beam and producing interference fringe planes in said gaseous medium as it passes through said gaseous medium and the angle of incidence of said controlled laser beam with respect to said fringe planes is the Bragg angle given by the first quadrant angle whose sine is half the ratio between the wavelength of the controlled laser beam and the spacing between said interference fringe planes.

4,714,903

DIELECTRIC RESONATOR DIRECTIONAL FILTER

Jerry C. Brand, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 20, 1986, Ser. No. 876,607
Int. Cl.[4] H01P *1/213, 7/10, 5/18*
U.S. Cl. 333—110 **2 Claims**



1. A dielectric resonator directional filter having an operating frequency comprising:

first and second parallel spaced apart transmission lines having an input defined by the first of said transmission lines and an output defined by the second of said transmission lines;

at least four dielectric resonators positioned adjacent said transmission lines and coupled thereto by magnetic field lines, a first pair of said resonators being positioned adjacent the first transmission line and equally spaced on opposite sides of a dividing line, a second pair of said resonators being positioned adjacent the second transmission line and equally spaced on opposite sides of the dividing line, resonators on one side of the dividing line being coupled by magnetic field lines and resonators on the other side of the dividing line being coupled together by magnetic field lines, and said resonators being spaced apart along said transmission lines so that substantially all electric energy at the operating frequency applied to the input appears at the output; and

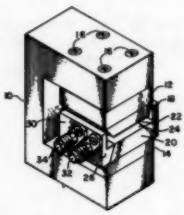
a shield positioned between the first pair of resonators and between the second pair of resonators to prevent magnetic coupling between resonators of the pairs.

4,714,904

MAGNETOSTATIC WAVE DEVICE UNIT

David A. Willems, Hoagland, Ind., assignor to ITT Aerospace Optical, Fort Wayne, Ind.

Filed Nov. 5, 1986, Ser. No. 927,774
Int. Cl.[4] H03H *9/10*
U.S. Cl. 333—148 **15 Claims**



1. A magnetostatic wave device magnetic biasing unit comprising:

a soft iron yoke;

first and second magnets secured opposite one another on said yoke to form a gap between said magnets;

first and second pole pieces secured to said first and second magnets, respectively, and tapered toward each other to form first and second opposed faces, respectively, within which magnetic flux produced by said magnets is concentrated;

a nonmagnetic metallic carrier member having a tapered opening within which said second tapered pole piece is fitted in electrical contact with said carrier member, said second opposed face of said second pole piece and the surface of said carrier member at the smaller end of said tapered opening lying in a common plane and forming a support surface adapted to support a magnetostatic wave device;

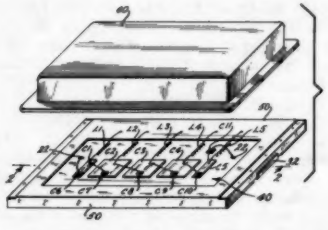
and means mounted on said carrier member for coupling an input signal from a signal source to a magnetostatic wave device supported by said second pole piece and said carrier member and for coupling an output signal from a magnetostatic wave device supported by said second pole piece and said carrier member to a utilization unit.

4,714,905

SMC FILTER AND METHOD OF MANUFACTURE THEREOF

Richard Bernstein, Oxford; William H. Anthony, Salisbury, both of Md., and David A. Lupfer, Cazenovia, N.Y., assignors to K & L Microwave, Salisbury, Md.

Filed Oct. 8, 1986, Ser. No. 916,559
Int. Cl.[4] H03H *3/00, 7/01, 7/075*
U.S. Cl. 333—167 **5 Claims**



5. In a surface mount-type chip providing a filter circuit having lands screened onto a dielectric substrate as first plates

of filter capacitors, and discrete air core inductors attached thereto for said filter, the improvement comprising:

a metallic coating on substantially all surface areas of said substrate, except for a central top portion of said substrate containing said lands and exposed portions of vias from said central top portion to surface mounting lead portions on a bottom of said substrate, said coating providing a second plate for said capacitors and a ground plane for said circuit and a portion of an EMI and RFI shield for said circuit; and

a formed metallic cover attached to said ground plane and spaced from and covering said inductors and lands, said cover providing a remainder of said EMI and RFI shield, while providing a physical shield for said inductors, and a solid, uniform profile adapted for subsequent handling by a pick and place component handling head.

4,714,906

DIELECTRIC FILTER WITH VARIABLE CENTRAL FREQUENCY

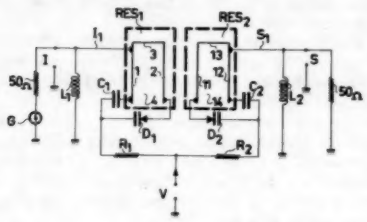
Bertrand D'Albaret, Cormeilles en Parisis, and Antoine Colombani, Ville D'Avray, both of France, assignors to Compagnie D'electronique et de Piezo-electricite, Argenteuil, France

Filed May 23, 1985, Ser. No. 737,161

Claims priority, application France, May 30, 1984, 84 08498

Int. Cl.[4] H01P *1/20*

U.S. Cl. 333—202 **9 Claims**



1. A tunable dielectric filter comprising a series of dielectric resonators including at least a first and a last resonator, each resonator comprising a ceramic body having at least six surfaces, two surfaces being opposed to one another and metallized to form a pair of opposed electrodes, and two other surfaces being opposed to one another and being free of electrodes, each of the electrodes having first and second ends, the first ends of each opposed electrodes being interconnected by a fifth surface of the ceramic body that is metallized with a coating that extends between the first ends of the two opposed electrodes, the second ends of the two opposed electrodes being connected by a sixth surface of the ceramic body that is free of any electrode to form a capacitive zone,

input and output means for coupling a signal to and from the filter, the input means being connected to a first end of one of the opposed metallized electrodes of the first resonator of the series and the output means being connected to a first end of one of the opposed metallized electrodes of the last resonator of the series, and

separate variable capacitance means being connected between the second ends of the two opposed electrodes of each resonator.

4,714,907

MINIATURE ELECTRICAL CIRCUIT BREAKER WITH MULTIPLE MOVING CONTACTS AND THERMOMAGNETIC TRIP RELEASE

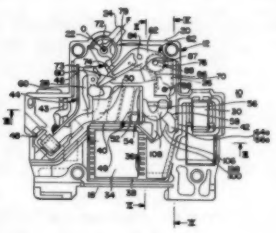
William Bartolo, Eybens; Louis Boillot, Grenoble; René Challande, Montmelian; Patrick De Robertis, Vizille; Jacky Duchenaud, Grenoble, and Jean-Claude Ramaciotti, Echirolles, all of France, assignors to Merlin Gerin, Grenoble Cedex, France

Filed Jul. 8, 1986, Ser. No. 883,331

Claims priority, application France, Jul. 31, 1985, 85 11839; Jan. 3, 1986, 86 00111

Int. Cl.[4] H01H *75/08, 77/04, 81/02*

U.S. Cl. 335—45 **13 Claims**



1. A low voltage miniature electric circuit breaker with insulated casing equipped with a mechanism controlled by a thermomagnetic trip release, comprising:

a first thermal trip release having a bimetallic strip cooperating with said mechanism when an overload current exceeds a thermal tripping threshold;

a second electromagnetic trip release for protection against short-circuit current, comprising a control coil electromagnet, made up by helical winding of a deformable conductor having a preset rigidity;

an end turn of said coil being extended with the same conductor by a tail cooperating with an adjustment device for the thermal tripping threshold of the first thermal trip release;

said tail being arranged as an adjustable support part of the bimetallic strip which has a foot inserted by soldering between said tail and an adjacent elecrical connection means electrically connected to a contact pad, to cause the current to flow thicknesswise through the foot of the bimetallic strip; and

a hinge located along said tail between the foot of the bimetallic strip and the end turn of the coil, to allow relative movement of one part of said tail due to the action of the thermal tripping threshold adjusting device, the other part of the tail connected to the end turn of the coil remaining appreciably stationary.

4,714,908

ELECTROMAGNETIC DEFLECTION-DISTORTION CORRECTOR

Seiji Watabe, Honjo; Isao Yokoyama, Nikaho; Masanori Sasaki, Kisakata; Yotaro Toyoshima; Sumio Takahashi, both of Nikaho, Japan, and Tsutomu Maeda, Wako, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Dec. 6, 1985, Ser. No. 806,167

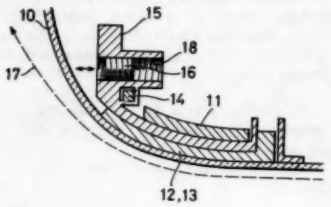
Claims priority, application Japan, Dec. 13, 1984, 59-261826

Int. Cl.[4] H01F *1/00*

U.S. Cl. 335—212 **7 Claims**

1. An electromagnetic deflection-distortion corrector for a cathode-ray tube display unit of the electromagnetic deflection type, the corrector comprising: a plurality of permanent magnets arranged adjacent and around the tubular rear wall of the cathode-ray tube display unit, and adjustor means for moving each permanent magnet forward and backward, towards and away from the tube wall in a direction parallel to the longitudi-

nal axis of the cylindrical neck of the cathode-ray tube, whereby residual distortion of the deflection pattern of the



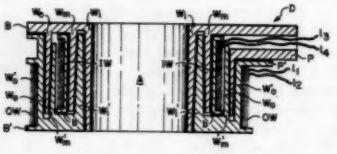
electron beam on the face plate of the cathode-ray tube is corrected by means of the movement of the permanent magnets.

4,714,909

SUPPORT FOR TRANSFORMER WINDINGS

Roger A. Dugas, Chester, N.H., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 29, 1985, Ser. No. 738,639
Int. Cl.[4] H01F *15/10, 27/30*
U.S. Cl. 336—192 **2 Claims**



1. A transformer assembly that is free from potting material comprising

a first base having a first group of coaxial closed walls including an inner wall extending from one side thereof and about an axis,

a second base having a second group of coaxial closed walls including an inner wall extending from one side thereof about said axis,

the said first and second bases being so oriented that said bases are on opposite sides of said walls and said first and second groups of walls nest within each other,

means defining an aperture in said first base that is inside the inner wall extending therefrom,

means defining an aperture in said second base that is inside the innerwall extending therefrom,

an inner winding mounted between adjacent nested walls, there being at least one wall of each of said groups between said inner winding and the inside of the innermost of the nested walls, and

an outer winding mounted about a wall, there being at least one wall from each of said groups between said inner and outer windings, and

one of said bases and the outermost wall extending therefrom being shaped so as to form therebetween an outwardly extending passageway from one end of said inner winding that is closer to said one base to a point having an air path to said outer winding that is sufficiently long to prevent arc-over, and

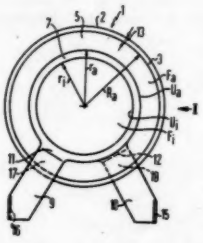
said inner winding having leads extending through said passageway.

4,714,910

ELECTRICAL COMPONENT HAVING HIGH STRENGTH GIVEN STRESSING DUE TO TEMPERATURE CHANGE AND DUE TO SURGE CURRENTS, PARTICULARLY A VARISTOR

Martin Schwingenschuh, Graz/Osterreich; Franz Meschan, Stainz/Osterreich, and Gert Ribitsch, Graz/Osterreich, all of Austria, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 5, 1987, Ser. No. 22,003
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1986, 3613787
Int. Cl.[4] H01C *7/10*
U.S. Cl. 338—21 **8 Claims**



1. An electrical component comprising:

a sintered ceramic body including a pair of opposed surfaces and a peripheral edge;

a pair of solderable metal coatings, each carried on a respective surface of said body; and

a pair of power supply elements each soldered to a respective metal coating and each including a flat loop comprising an outer edge and an inner edge, and

a lead clip extending from said outer edge and spaced from the respective metal coating,

each of said power supply elements including a thickness in the range of 0.2 through 1 mm and dimensioned in accordance with the relationships $Fa/Fi = Ua/Ui = 1.05$ through 1.35,

where Fa is the area between the outer edge of a power supply element and the peripheral edge of said body, Fi is the area enclosed within an inner edge of a power supply element, Ua is the peripheral dimension of a power supply element and Ui is the inner peripheral dimension of a power supply element.

4,714,911

TECHNIQUE FOR TREATING MANUFACTURED THICK FILM RESISTORS

Alfonso Di Mino, and Andre Di Mino, both of Woodcliff Lake, N.J., assignors to ADM Tronics Unlimited, Inc., Northvale, N.J.

Continuation-in-part of Ser. No. 909,475, Sep. 19, 1986, Pat. No. 4,705,931. This application May 11, 1987, Ser. No. 48,416
Int. Cl.[4] H01C *10/00*
U.S. Cl. 338—195 **5 Claims**

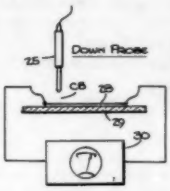
1. A technique for enhancing the electrical characteristics of a thick film resistor which is manufactured to tolerances of about ±20% while correcting ohmic value so that its final resistance has a desired target value, said technique comprising the steps of:

A. measuring the resistor to determine its manufactured value;

B. conducting a heating current through the resistor to cause its resistance to rise to a peak value well above the target value; and

C. subjecting the resistor to a corona discharge beam irradiating the body thereof to cause its resistance value to

decrease from the peak to the target value whereby the combined effect of heating and irradiation enhances the



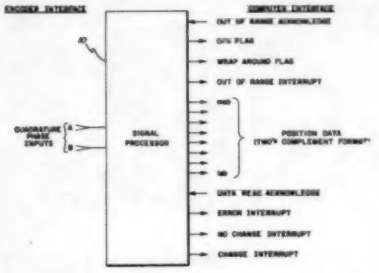
characteristics of the resistor and imparts thereto the desired final value.

4,714,913

QUADRATURE PHASE SIGNAL PROCESSOR

Robert K. Cohen, 244 Hansen Ave., Albany, N.Y. 12208

Filed Jul. 16, 1985, Ser. No. 755,473
Int. Cl.[4] H03M *1/30*
U.S. Cl. 340—347 P **13 Claims**



1. A processor for converting a pair of quadrature phase encoded signals from a linear or rotational displacement measuring device or other device producing said signals into computer readable data representative of encoder position, comprising:

first register means for receiving the quadrature phase signals and storing the state of each of said signals for one clock cycle,

second register means for receiving the outputs of said first register means and storing the states of each of said outputs during the same clock cycle,

clock means connected to said first register means and said second register means for loading a new state of each of said encoded signals into said first register means and for loading the outputs of said first register means representing the previous state of each of said encoded signals into said second register means each clock cycle,

decoder means for receiving the outputs of said first register means and outputs of said second register means each clock cycle and decoding these outputs to provide a binary output signal indicative of the transitions between the previous state and the new state of each of said encoded signals for each clock cycle, each such binary output signal comprising one from among a group of signals comprising an UP signal, a DOWN signal, an ERROR signal and a NO CHANGE signal,

counter pulse control means for receiving from said decoder means and converting UP signals and DOWN signals to an up pulse stream and a down pulse stream respectively,

counter means for receiving said up pulse stream and said down pulse stream and for outputting data in two's complement format representative of encoder position,

latch means for receiving and storing the data from said counter and providing the storing data to a separate computer upon receipt of a DATA READ ACKNOWLEDGE signal from the computer,

latch update control means for updating the latch with data from the counter at the clock cycle and for temporarily inhibiting latch updating upon receipt of said DATA READ ACKNOWLEDGE signal, and

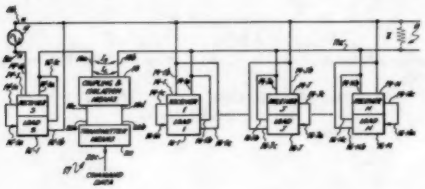
error control means for receiving ERROR signals from said decoder means and in response thereto providing an ERROR INTERRUPT signal simultaneously to the computer and to the latch update control means, the latch update control means inhibiting updating of the latch in response to said ERROR INTERRUPT signal, whereby last valid data is stored in the latch for readout to the computer.

4,714,912

SINGLE-CONDUCTOR POWER LINE COMMUNICATIONS SYSTEM

Victor D. Roberts, Burnt Hills, and Joseph C. Borowiec, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1986, Ser. No. 948,180
Int. Cl.[4] H04M *11/04*
U.S. Cl. 340—310 R **19 Claims**



1. A system for communicating digital information on a power line circuit having a plurality of conductors interconnecting at least one AC power source and at least one power-consuming load, comprising:

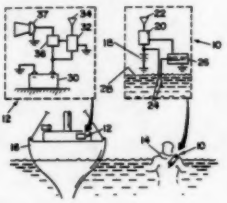
at least one means, coupled to at least one of the conductors, for receiving a PLC signal and for controlling at least one controlled-power-consumption load responsive to the information received; and

at least one transmitter for forming the PLC signal by injection of a PLC signal current in series with only a single one of the power line conductors, and comprising: input means for receiving digital information to be transmitted; generator means for providing an output signal with (1) cyclic alternation between first and second states at a PLC frequency, at least two orders of magnitude greater than the AC source frequency, responsive to a first condition of the digital information at said input means, and (2) another selection of at least the second state, responsive to a second condition of the digital information at said input means; switching means for providing a controllable impedance with respective low impedance and high impedance states responsive to respective first and second states of said output signal; and saturable means for effectively coupling the switching means to the single conductor for injecting the PLC signal current therein only when the current in the single conductor is not greater than a saturation current level.

4,714,914
LIQUID IMMERSION ALARM

Richard A. Boe, Keyport, Wash., assignor to Automatic Safety Products, Mammoth Lakes, Calif.

Continuation of Ser. No. 558,015, Dec. 5, 1983, abandoned. This application Apr. 15, 1986, Ser. No. 853,379
Int. Cl.[4] G08B *23/00*
U.S. Cl. 340—573 **15 Claims**



1. A liquid immersion device adapted to be worn by a user and insensitive to the random presence of said liquid, comprising:

a battery power source having first and second terminals with said second terminal connected to ground;

a load device having an input terminal connected to said first terminal of said battery power source and a ground terminal;

a liquid activated switch having first and second terminals with said first terminal connected to said first terminal of said battery power source;

a delay circuit having first, second and third terminals, including:

said first terminal connected to said second terminal of said liquid activated device, said second terminal connected to said ground terminal of said load device and said third terminal connected to ground;

an electrically activated solid state flip flop switch having a set terminal;

electronic integrating accumulation circuit means for delaying the activation of said electrically activated solid state flip flop switch connected to said set terminal; and

electronic integrating decumulation circuit means to control the accumulation of said first mentioned electronic integrating accumulation circuit means connected between said set terminal and ground;

said delay circuit thus connecting said second terminal of said battery power source to said ground terminal of said load through said delay circuit after said first and second terminals of said liquid activated device are immersed in liquid for a predetermined time period, whereby said timed immersion causes said battery power source to be connected to said load device to transmit an alarm signal.

4,714,915
PORTABLE ELECTROSTATIC FIELD SAFETY MONITOR

Marcel Hascal, 1 Boldmere Crescent, Willowdale, Ontario, Canada M2J 2R8; Sergio Lopez, 83 Milldock Drive, Scarborough, Ontario, Canada M1C 4B8; Andrew Danielski, 180 Sherwood Street, Oshawa, Ontario, Canada L1G 3L8, and Adrian Mihai, 181 Robert Hicks Drive, Willowdale, Ontario, Canada M2R 3R3

Filed Sep. 29, 1986, Ser. No. 912,976
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—657 **12 Claims**

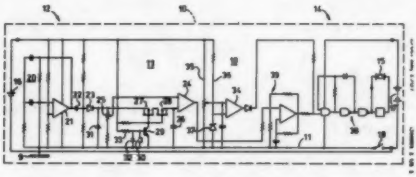
1. A portable monitoring system for detecting a radiated electrostatic field and producing an audible warning when the intensity of the detected field exceeds a selected predetermined value, comprising

detector circuit means for deriving a d.c. signal corresponding to the detected field intensity,

comparator means for comparing the d.c. signal with a selected reference level for producing an output signal when the d.c. signal level exceeds said reference level, the comparator means including a differential amplifier having a first input circuit connected to receive said d.c. signal and a second input circuit connected to receive a signal defining said reference level, and

audible alarm means responsive to said output signal for sounding a warning,

characterized in this, that the monitoring system further

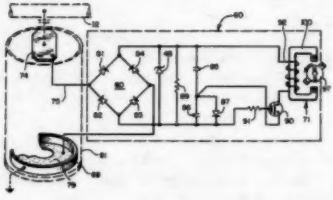


comprises a storage device connected in said second input circuit of the differential amplifier for storing the signal defining said reference level, the storage device being interconnected with the output of the detector circuit means by a manually operable switching circuit, said switching circuit including a delay device and being operable to apply the d.c. signal to the storage device after a predetermined delay thereby to reset the reference level so as to correspond to the detected field intensity at a location selected by the user.

4,714,916
VOLTAGE LOSS DETECTOR

Edmund O. Schweitzer, Jr., 2433 Center St., Northbrook, Ill. 60062

Filed Mar. 28, 1986, Ser. No. 845,860
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—664 **20 Claims**



1. A loss of voltage detector for producing a control effect in response to the loss of voltage in a monitored conductor, comprising:

a first capacitor;

a second capacitor;

charge circuit means powered by alternating voltage in the monitored conductor for developing a charge current for charging said first and second capacitors to respective predetermined charge levels;

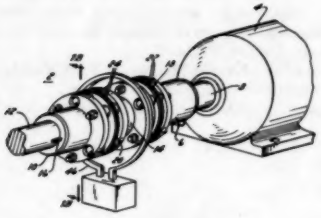
charge transfer circuit means operable following interruption of said charge current for transferring a portion of said charge on said first capacitor to said second capacitor, the terminal voltage across said second capacitor progressively increasing as said charge is transferred; and

triggger ciruit means responsive to the voltage across said second capacitor increasing beyond a predetermined threshold level for discharging said first capacitor to provide the control effect.

4,714,917
APPARATUS FOR DETECTING CRACKS IN A FLEXIBLE COUPLING

Louis F. Counter, Greendale; Richard C. Born, Wauwatosa; LeRoy M. Walters, Milwaukee; Lowell B. Ziese, Greendale, and Lawrence G. Searing, Milwaukee, all of Wis., assignors to Rexnord Inc., Brookfield, Wis.

Filed Oct. 10, 1986, Ser. No. 917,765
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—679 **19 Claims**



1. An apparatus for detecting cracks in a flexible disc of a flexible coupling connected between a rotary power source and a device driven through the flexible coupling by the power source comprising:

an electrically insulated conductive line on the flexible disc, the conductive line being normally continuous and being discontinuous upon cracking of the disc;

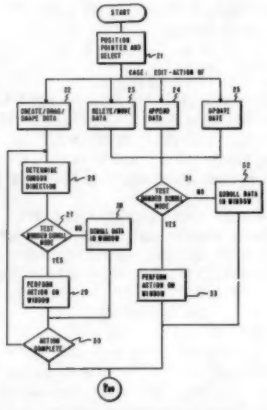
first circuit means mounted on the coupling and connected to the conductive line for generating and transmitting a first signal while the conductive line is continuous and a second signal while the conductive line is discontinuous; and

stationary second circuit means for receiving the first and second signals from the first circuit means and providing an indication of either the first signal or the second signal.

4,714,918
WINDOW VIEW CONTROL

Barbara A. Barker, Round Rock, and Irene H. Hernández, Austin, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1984, Ser. No. 605,545
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—724 **9 Claims**



1. In a display computer system, a method of controlling a view of information displayable within a window upon editing said information wherein said window is displayable over other information being displayed on said system, said method comprising:

(a) providing said system with both an information scrolling mode and a border scrolling mode of operation;

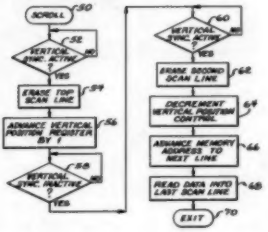
(b) selecting one of said modes operation; and

(c) causing window to increase in size, responsive to a border scrolling mode being selected, upon the addition of new information to said existing information being displayed in said window.

4,714,919
VIDEO DISPLAY WITH IMPROVED SMOOTH SCROLLING

Mark J. Foster, Stevensville, Mich., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Jul. 30, 1984, Ser. No. 635,385
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—726 **7 Claims**



1. In a video display system including a raster-scanned video display unit sequentially scanned by an electron beam for producing a video image thereon, wherein said video image is formed by a plurality of scan lines on said video display unit and wherein a vertical sync pulse occurs in a consistent pattern between sequential scans of said video display unit by said electron beam during a vertical retrace interval, a method for the continuous smooth scrolling of said video image on said video display unit comprising the sequence of stpes of:

detecting a first vertical sync pulse during a first vertical retrace interval;

erasing the contents of the first scan line of the video image during said first vertical retrace interval;

displacing the video image upward one scan line during said first vertical retrace interval;

detecting a second, next-subsequent vertical sync pulse during a second, next-subsequent vertical retrace interval;

erasing the contents of the second scan line of the video image during said second vertical retrace interval;

displacing the video image downward one scan line during said second vertical retrace interfal;

starting the next sequential scan of said display unit with a third scan line of said video image at the first line of the raster; and

updating the last scan line of said video image.

4,714,920
METHOD FOR REPRESENTING THREE DIMENSIONAL STRUCTURES

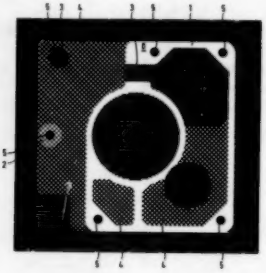
Dieterich Andernach, Seebruck, and Manfred Wurm, Zorneding, both of Fed. Rep. of Germany, assignors to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Jul. 19, 1984, Ser. No. 632,407
Claims priority, application Fed. Rep. of Germany, Jul. 27, 1983, 3327117
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—747 **16 Claims**

1. A method for controlling a device to represent in a single

two-dimensional projection the surface of a three-dimensional object comprising a plurality of viewing planes, each viewing plane representing a depth level of the surface, the viewing planes spaced from one another along a pre-selected viewing direction, the method comprising the following steps:

assigning a unique graphic pattern to each viewing plane, the graphic patterns assigned in a hierarchy, the deeper planes being assigned a higher order in the hierarchy such that hierarchically higher orders of graphic patterns will be represented with priority over hierarchically lower orders of graphic patterns;



representing the surface with the graphic pattern corresponding to each existing depth level of the surface; and

representing changes in the surface at a selected depth by using a movable tool image, the movable tool image being assigned the same graphic pattern as the viewing plane corresponding to the selected depth, the representation such that graphic patterns corresponding to higher lying depths are written over by the movable tool image but graphic patterns corresponding to depths no higher than the viewing plane remain unaffected.

4,714,921

DISPLAY PANEL AND METHOD OF DRIVING THE SAME

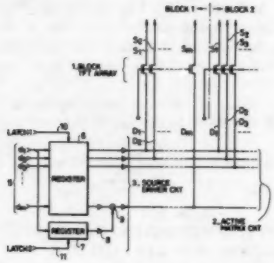
Hideo Kanno; Shinichi Yamashita, both of Kawasaki; Masahiko Enari, Yokohama; Mitsutoshi Kuno, Kawasaki, and Atsushi Mizutome, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 29, 1986, Ser. No. 823,731

Claims priority, application Japan, Feb. 6, 1985, 60-19879

Int. Cl.[4] G09G *3/00*

U.S. Cl. 340—784 **15 Claims**



9. A liquid crystal display panel comprising:

a liquid crystal display section;

an array of switching elements for sampling/holding which are arranged on the side of video signal lines of said liquid crystal display section by a quantity as many as the number of said video signal lines;

an active matrix circuit which divides said switching element array into a plurality of blocks and time-sharingly drives said blocks;

an external video signal output circuit of output lines as many as the number of signal lines of one block of said switching element array; and

an arithmetic operating circuit for eliminating a high luminance line for every block which is produced in a video image.

4,714,922

INTERCONNECTION NETWORKS

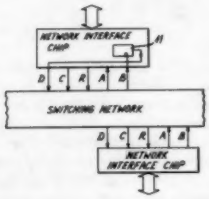
Martin D. Cripps, London, and Anthony J. Field, Christchurch, both of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 668,858, Nov. 6, 1984, abandoned. This application Mar. 4, 1987, Ser. No. 22,607

Claims priority, application United Kingdom, Nov. 8, 1983, 8329728

Int. Cl.[4] H04Q *1/00*

U.S. Cl. 340—825 **10 Claims**



1. A serial switched interconnection network which receives switching signals from external sources, said network comprising:

a plurality of stages of switching nodes, each node having a number of paths thereto and a number of paths therefrom; and

a switching unit being provided at each node to connect any path thereto to any path therefrom in accordance with the switching signals, the nodes of successive stages being so interconnected that any path to the first stage of nodes can be ultimately connected to any path from the final stage of nodes, each switching unit having means for sending a request back up a path thereto when addressed along that path for the switching signals to switch the switching unit from which such request is sent and means enabling the selfsame switching unit to switch that path to a path therefrom on receipt of the switching signals provided in response to such request.

4,714,923

METHOD AND APPARATUS FOR SHEDDING LOAD IN A COMMUNICATIONS CONTROLLER OF A DATA COMMUNICATIONS SYSTEM

C. R. V. Tassle, Hanover Park, and Thomas A. Freeburg, Arlington Heights, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 719,929, Apr. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 659,938, Oct. 12, 1984, Pat. No. 4,597,105, which is a continuation-in-part of Ser. No. 441,327, Nov. 12, 1982, Pat. No. 4,481,670. This application Feb. 9, 1987, Ser. No. 15,488

Int. Cl.[4] H04Q *1/00*

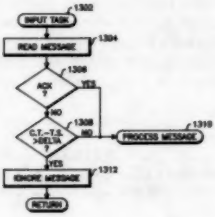
U.S. Cl. 340—825.06 **12 Claims**

1. A method of controlling messages applied by remote stations to multi-tasking data processing means, the message including first type messages which are not re-asserted and second type messages which are re-asserted until ackowledged by the data processing means, said data processing means including means for generating the current time and at least

two receiving means each receiving a copy of the messages from a remote station, said method comprising the steps of:

periodically executing on a low priority basis a timestamp task of saving the value of the current time;

receiving at least two copies of each message from a remote station; and



executing on a high priority basis for each received message, an input task comprised of the steps of identifying the received message as a first type message or a second type message; comparing the value of the current time to the saved value; and ignoring the received messasge if it is identified as a second type message and the difference between the value of the current time and the saved value is greater than a predetermined amount.

4,714,924

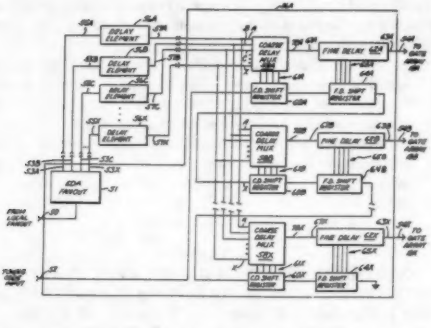
ELECTRONIC CLOCK TUNING SYSTEM

John H. A. Ketzler, White Bear Lake, Minn., assignor to ETA Systems, Inc., St. Paul, Minn.

Filed Dec. 30, 1985, Ser. No. 814,654

Int. Cl.[4] H04Q *9/04*; H03K *5/13*

U.S. Cl. 340—825.210 **15 Claims**



1. An electronic clock tuning system for distributing tuned clock pulse trains to integrated circuit gate arrays of a digital computer in which the gate arrays are organized into a plurality of regions on each of a plurality of major function circuit boards; including:

master oscillator means for producing a clock pulse train;

master fanout means operatively connected to the master oscillator means for distributing the clock pulse train to each major function circuit board;

a plurality of local fanout means, each mounted with respect to one of the major function circuit boards and operatively connected to the master fanout means for distributing the clock pulse train to each region of the major function circuit board;

tuning code generator means for generating coarse and fine digital delay tuning codes, for each gate array, representative of desired discrete

a plurality of electronic delay means, each associated with and mounted with respect to a region of a major function circuit board and operatively connected to the local fanout means on the circuit board, for distributing the clock pulse train to each gate array of the region of the main function circuit board with which it is associated, and for delaying the distributed clock pulse train by one of a plurality of discrete delay periods, each electronic delay means comprising for each gate array of the region with which it is associated:

coarse delay select means coupled to the tuning code generator means for producing digital coarse delay select signals as a function of the coarse delay tuning codes;

fine delay select means coupled to the tuning code generator means for producing digital fine delay select signals as a function of the fine delay tuning codes;

coarse delay means coupled to the coarse delay select means for delaying the clock pulse train supplied to the gate array by discrete coarse delay periods represented by the coarse delay select signals; and

fine delay means coupled to the coarse delay means and the fine delay select means for delaying the clock pulse train supplied to the gate array by discrete fine delay periods represented by the fine delay select signals.

4,714,925

LOOP DATA LINK

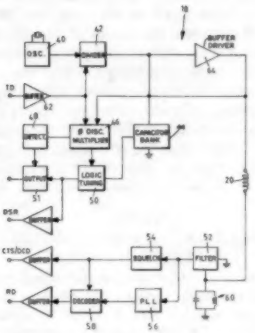
David Bartlett, Hilton, London, United Kingdom, assignor to EMX International Limited, Aylesbury, England

Filed Dec. 20, 1985, Ser. No. 811,479

Claims priority, application United Kingdom, Dec. 31, 1984, 8432807

Int. Cl.[4] H04Q *7/00*; G07B *15/02*

U.S. Cl. 340—825.55 **3 Claims**



1. Apparatus for transferrring data between a vehicle and a collecting point comprising: on the vehicle, a data logger and first transmitting and receiving means, and, at the collecting point, second transmitting and receiving means, means for storing data, an inductive loop, and detection means for detecting the presence of the vehicle within an active area of the loop, the detection means, upon detecting the presence of the vehicle within the active area, initiating the transmission of a signal, by the second transmitting means, which is received by the first receiving means, the detection means including a phase discriminator for detecting a change in the inductance of the loop, data from the storage means which is transmitted by means of the second transmitting means being used to multiplex the phase discriminator in marking and spacing conditions, the loop inductance being measured only when the data is in the marking condition.

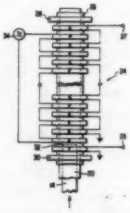
4,714,926
ROD POSITION INDICATION SYSTEM WITH TEMPERATURE COMPENSATION

James A. Neuner, Richland Township, Lebanon County, and Dirk J. Boomgaard, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 606,422, May 2, 1984, abandoned. This application Oct. 23, 1986, Ser. No. 922,792

Int. Cl.[4] G01C *19/08*

U.S. Cl. 340—870.36 10 Claims



1. A position indication system for detecting the position of an elongated, magnetic member which is linearly movable between first and second positions along an axis corresponding to its longitudinal dimension, wherein the member has magnetic and electrical properties which vary as a function of the temperature of the member, comprising:

sensing means operatively associated with the member for producing a first output signal which corresponds to the position of the member and which fluctuates with changes in the temperature of the member;

temperature monitoring means including electrical coils inductively coupled together, with one of said coils being adjacent a zone in which at least a portion of the magnetic member is always present for producing a second output signal which varies in direct response to changes in the magnetic and electrical properties of the member; and

calibrating means connected to said sensing means and said monitoring means for receiving the first and second output signals, said calibrating means containing predetermined calibrating information for producing a third output signal, in dependence of the first and second output signals, which represents the position of the member compensated for changes in temperature of the member.

4,714,927
PULSE DOPPLER RADAR WITH VARIABLE PULSE REPETITION RATE

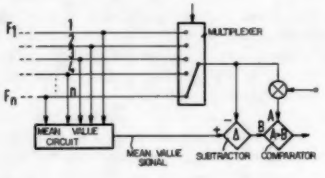
Harald Siegel, Gauting, and Rudolf Hauptmann, Dachau, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 5, 1984, Ser. No. 617,510

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1983, 3321263

Int. Cl.[4] G01S *13/52, 13/54*

U.S. Cl. 342—160 7 Claims



1. In a pulse doppler radar having a variable pulse repetition rate and means for cancelling permanent echos and for integrating reflected pulses, the improvement comprising a plurality of frequency domain filters, comparator means connected to receiver outputs from said filters for comparing the output of each filter individually with the mean value of signals produced by all other filters, whereby reflected pulses received by said pulse dopler radar are subjected to a coherent integration modified by simplified vectorial addition of the pulses, and means connected to said comparator means for supplying a signal representing a target indication in response to the output of said comparator, said target indicating signal adapted for direct connection to a target indicator for producing a target display.

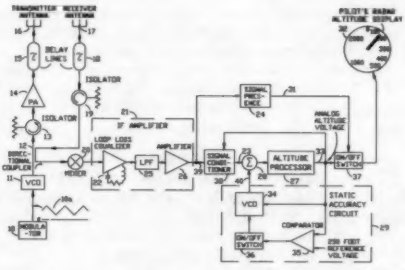
4,714,928
RADAR ALTIMETER STATIC ACCURACY CIRCUIT

Jerry C. Schmitt, 19930 Countryview Ter., Spring Hill, Kans. 66083

Filed Mar. 3, 1986, Ser. No. 835,634

Int. Cl.[4] G01S *7/40*

U.S. Cl. 342—174 5 Claims



1. In a radar altimeter having an intermediate frequency amplifier and an altitude processor, a static accuracy circuit for reducing erroneous altitude indications caused by stationary nulls comprising:

(a) a voltage controlled osciallator means for producing a signal whose frequency varies so that it is equal to the frequency of the output signal of the intermediate frequency amplifier at any instant in time; and

(b) a means for feeding the signal back to the output of the intermediate frequency amplifier so that the output of the intermediate frequency amplifier and the signal are combined.

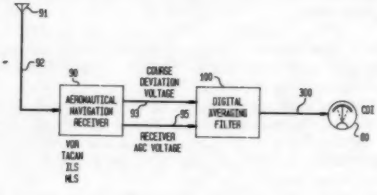
4,714,929
DIGITAL AVERAGING FILTER PARTICULARLY SUITED FOR USE WITH AIR NAVIGATION RECEIVERS

Eldon F. Davidson, 240 Flower Dr., Folsom, Calif. 95630

Filed Sep. 4, 1986, Ser. No. 904,109

Int. Cl.[4] G01S *5/04;* H03H *00/00;* G06G *7/12;* G01C *21/00*

U.S. Cl. 342—439 18 Claims



1. Apparatus for a filter, adapted for use in conjunction with an aeronautical navigation receiver and operative in response to a zero centered course deviation voltage, for reducing oscil-

latory error components present in said course deviation voltage, said apparatus comprising:

means for sampling said course deviation voltage to yield corresponding digital signal representations thereof:

means, operative in response to said digital signal representations, for converting each of said digital signal representations into a corresponding series of pulses, wherein the number of pulses in said series is defined by the value of said digital representation;

means, responsive to said pulse series, for accumulating the total number of individual pulses in every one of said pulse series that occurs during a pre-defined period of time in order to produce a totalized value;

means for calculating an average value in response to said totalized value when said pre-defined time period has elapsed and for applying said average value to converting means;

means for converting said average value to a form suitable for display on a course deviation meter, wherein said average value is substantially free of said oscillatory error components; and

means, connected to said calculating means and said accumulating means for resetting said average value and said totalized values to respective first and second pre-defined values after said average value has been applied to said converting means.

4,714,930

ANTENNA FEED POLARIZER

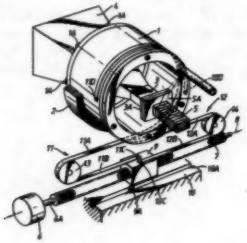
Trevor Winter, Maldon, and William Macey, Brentwood, both of United Kingdom, assignors to The General Electric Company p.l.c., London, England

Filed Aug. 28, 1986, Ser. No. 901,374

Claims priority, application United Kingdom, Oct. 3, 1985, 8524396

Int. Cl.[4] H01Q *13/00*

U.S. Cl. 343—786 **6 Claims**



1. A rotatable antenna feed polariser comprising a motor (6), an elongate threaded member (7) connected to be rotated about its longitudinal axis (8) by said motor (6), a drive member (9) which co-operates with the thread of said elongate member (7) so as to be driven in the direction of said axis (8) when said elongate member (7) rotates, and a flexible connector (11,12) attached to said drive member (9) and wrapped at least partly around said polariser (3) or around an element (1) connected to said polariser (3) whereby said polariser is caused to rotate when the motor (6) operates.

4,714,931

INK JET PRINTING SYSTEM

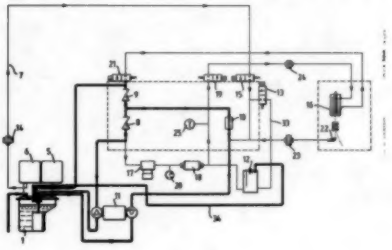
William G. Erskine, and Richard J. Marsden, both of Cambridgeshire, England, assignors to Domino Printing Sciences PLC., Cambridge, England

Filed Dec. 10, 1986, Ser. No. 940,094

Claims priority, application United Kingdom, Dec. 16, 1985, 8530885

Int. Cl.[4] G01D *15/18*; E03B *5/00*

U.S. Cl. 346—75 **6 Claims**



1. A continuous ink jet printing system comprising

(1) an ink circuit, said circuit having:

(a) an ink reservoir;

(b) a pump;

(c) a nozzle from which a continuous stream of ink droplets is projected in use under pressure from said pump;

(d) a device for collecting unused droplets;

(e) a recirculation circuit for returning unused ink to said ink reservoir; and,

(2) means for determining the viscosity of said ink at selected intervals, wherein said viscosity determining means has

(i) a measuring tank;

(ii) an inlet to said tank connected to said ink circuit to receive ink under pressure, said inlet having a flow restriction;

(iii) a vent/return pipe to vent said tank and enable ink to be returned to said reservoir;

(iv) an outlet for draining ink from said tank and returning it to said pump, said outlet including a valve to open and close said outlet;

(v) a level detecting means in said tank;

(vi) a timing means to measure the time taken for said tank to fill from a first level to a second level detected by said level detecting means; and

(vii) means for providing a signal representative of the viscosity of said ink.

4,714,932

INK JET ANGULARLY-ADJUSTABLE NOZZLE PRINTHEAD

Jean-Louis Reynaud, Bourg Lès Valence, France, assignor to Imaje S.A., Bourg Lès Valence, France

PCT No. PCT/FR86/00014, § 371 Date Sep. 16, 1986, § 102(e) Date Sep. 16, 1986, PCT Pub. No. WO86/04298, PCT Pub. Date Jul. 31, 1986

PCT Filed Jan. 20, 1986, Ser. No. 916,483

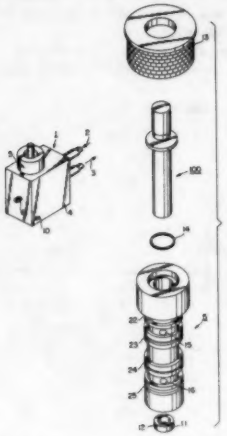
Claims priority, application France, Jan. 24, 1985, 85 01159

Int. Cl.[4] G01D *15/18*; B05B *3/14*

U.S. Cl. 346—75 **6 Claims**

1. Multinozzle ink projection writing device, characterized in that each nozzle (12) belongs to a module (1) comprising a body (4) fitted with an ink feed (2) and a drain outlet (3) and working in conjunction with a gun (5) bearing the ink piezoelectric excitation means (100), this gun being equipped at its periphery with two sets of O-ring seals (22,23) and (24,25) respectively demarcating the draining and feed chamber so that the orientation of the jet in relation to the orifice of the ink drop ejection nozzle (12) can be adjusted by rotating the ink

feed chamber according to an angle (α) capable of varying from 0° to 360°, each of these modules (1) comprising an orifice



(10) designed to receive a spindle (31) around which the module can rotate according to an angle (β).

4,714,933

LASER PICTURE-DRAWING APPARATUS

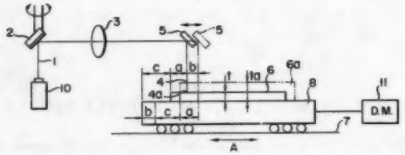
Akira Suzuki, Numazu, Japan, assignor to Toshiba Machine Co., Ltd., Tokyo, Japan

Filed Oct. 8, 1986, Ser. No. 916,786

Claims priority, application Japan, Oct. 8, 1985, 60-224065

Int. Cl.[4] G01J *9/42*; G03G *15/28*; G01J *1/20*

U.S. Cl. 346—108 **7 Claims**



1. A laser picture-drawing apparatus comprising:

support means for supporting a medium having a surface on which a figure is to be drawn,

a light source for emitting a laser beam,

means for deflecting the laser beam,

focussing means for focussing the deflected beam as a focal point on the surface to be drawn,

reflecting means disposed movably along an optical axis between said focussing means and the surface to be drawn, for reflecting the beam from said focussing means in a figure-drawing direction,

drive means for moving said reflecting means along the optical axis at a distance according to the thickness of the medium.

4,714,934

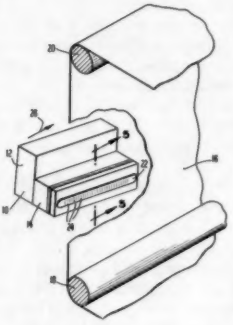
APPARATUS FOR PRINTING WITH INK JET CHAMBERS UTILIZING A PLURALITY OF ORIFICES

Robert L. Rogers, Sandy Hook, Conn., assignor to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Nov. 26, 1985, Ser. No. 801,925

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **7 Claims**



1. An impulse ink jet apparatus for printing bars in a bar code comprising a plurality of side-by-side chambers extending along a line slanted with respect to the direction of scanning, each of said chambers including a plurality of orifices arrayed along a line extending substantially transverse to the scanning direction and means for ejecting a plurality of droplets from the orifices of each chamber including a plurality of transducers, one of said transducers being coupled to each of said chambers, said plurality of orifices for each of said chambers being arrayed along a line extending to right angles to said scanning direction such that the overall field of droplets ejected from each of said plurality of orifices prints a segment of a bar but does not overlap with the overall field of droplets ejected from each other said plurality of orifices which print a different segment of the bar.

4,714,935

INK-JET HEAD DRIVING CIRCUIT

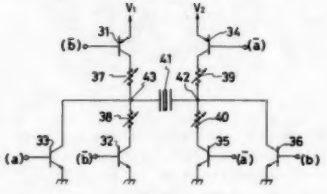
Mitsuru Yamamoto; Nobuaki Sakurada, both of Yokohama, and Yoshitaka Watanabe, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 609,803, May 14, 1984, abandoned. This application Sep. 23, 1986, Ser. No. 910,818

Claims priority, application Japan, May 18, 1983, 58-86952; May 27, 1983, 58-93783; Jun. 3, 1983, 58-99089

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **10 Claims**



1. An ink-jet head driving circuit comprising:

a pressure chamber adapted to be filled with a recording liquid;

a piezo-electric element having a polarization direction for emitting recording liquid by deforming said pressure

chamber due to the charge and discharge of said piezo-electric element;

first charging means for charging said piezo-electric element with a voltage of a first level at a first polarity opposed to the polarization direction of said piezo-electric element;

second charging means for charging said piezo-electric element with a voltage of a second level at a second polarity which is different from said first polarity, said second charging means deforming said pressure chamber by charging said piezo-electric element at said second polarity so as to emit recording liquid, said second polarity being the polarization direction of said piezo-electric element;

voltage applying means for applying a voltage of said first level to said piezo-electric element through said first charging means, and for applying a voltage of said second level to said piezo-electric element through said second charging means, said voltage applying means comprising adjusting means for adjusting at least one of said first-level voltage and said second-level voltage;

first means for adjusting the time width during which said first-level voltage is applied by said voltage applying means;

second means for adjusting the time width during which said second-level voltage is applied by said voltage applying means; and

discharging means for controlling a discharge time constant of said piezo-electric element, wherein said discharging means includes a discharge path having a resistor therein.

4,714,936

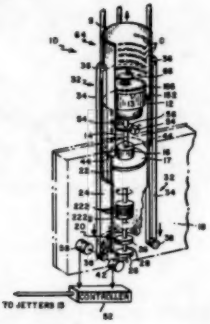
INK JET PRINTER

Richard R. Helinski, Hudson; Carl D. Lutz, Derry; Thomas R. Peer, Londonderry, and Philip A. Eno, East Hampstead, all of N.H., assignors to Howtek, Inc., Hudson, N.H.

Filed Jun. 24, 1985, Ser. No. 749,861

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **21 Claims**



1. A rotary ink jet printer comprising

A. a print wheel including a rotary support member for positioning within a printing medium wrapped as a collinear semicylinder about the print wheel;

B. means for rotating the support member about its rotary axis;

C. a plurality of ink jetters supported by the support member, each said jetter being arranged to project ink droplets radially from the support member in response to electrical signals;

D. an ink reservoir mounted to the support member below said jetters, said ink reservoir having a plurality of different ink chambers, one of said chambers being substantially larger than the other chambers;

E. means for conducting ink from each chamber to selected jetters of said plurality of jetters when said support member is rotated, the number of jetters to which ink is conducted from said one chamber being substantially greater than the number of jetters of which ink is conducted from each of the other chambers and the entrances of said conducting means from all of said chambers being located adjacent to the walls of said chambers furthest from said rotary axis;

F. means for aiming each jetter independently of the others in a first direction parallel to said rotary axis so that said print wheel can print a succession of dots in a plurality of different colors at a plurality of different line positions on the printing medium; and

G. means for applying electrical signals selectively to said jetters.

4,714,937

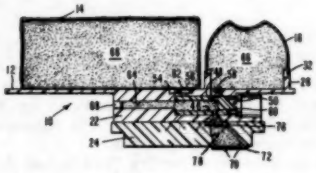
INK DELIVERY SYSTEM

George T. Kaplinsky, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 2, 1986, Ser. No. 914,225

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **15 Claims**



1. An ink delivery system comprising in combination:

(a) an ink bag for storing a quantity of ink;

(b) a print head for delivering ink to a printing medium;

(c) a bladder for providing a supply of ink to said print head;

(d) a valve for providing a closed mode, a refill mode for conveying ink from said ink bag to said bladder, and a print mode for conveying ink from said bladder to said print head; and

(e) means for supporting said ink bag, said bladder, said print head and said valve in cooperative association.

4,714,938

WARNING APPARATUS FOR CAMERA

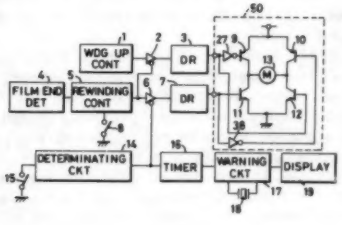
Kazuyuki Kazami; Toshiyuki Nakamura, both of Tokyo, and Hiroshi Wakabayashi, Yokohama, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Jan. 27, 1987, Ser. No. 7,171

Claims priority, application Japan, Jan. 29, 1986, 61-11351[U]; Mar. 31, 1986, 61-47730[U]

Int. Cl.[4] G03B *1/12*

U.S. Cl. 354—173.1 **6 Claims**



1. A camera capable of automatically rewinding a film into a cartridge, comprising:

(a) detection means for detecting completion of a film rewinding operation and producing a detection signal;

(b) warning means, responsive to the detection signal, for warning; and

(c) control means for controlling said warning means, said control means having timer means for measuring a predetermined period of time.

4,714,939

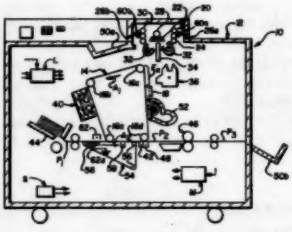
ELECTROGRAPHIC REPRODUCTION APPARATUS

Douglas K. Ahern, Rochester; William Y. Fowlkes, Fairport, and Donald S. Rimai, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 794,879, Nov. 4, 1985. This application Aug. 7, 1986, Ser. No. 894,174

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 TR 12 Claims



1. Electrographic reproduction apparatus capable of producing simplex or duplex copies on a receiver member traveling along a path, said apparatus including:

a first dielectric member movable along a first path, a portion of such first path being tangent to one side of such receiver member travel path;

means for sequentially forming transferable images, corresponding to information to be reproduced, on said first dielectric member;

a second member movable along a second path, one portion of said second path being tangent to such receiver member travel path on the opposite side from said first path, and another portion of said second path being located to position a portion of said second member in image transfer relation to said first dielectric member; and

transfer means, located adjacent to the portion of the second path where said first and second members are in image transfer relation, for selectively establishing an electrostatic transfer field of a first effective direction for transferring one transferable image from said first dielectric member to said second member or of a second effective direction for transferring said one transferable image from said second member to one side of a receiver member.

4,714,940

IMAGE PROCESSING APPARATUS HAVING DISPLAY MEANS TO MONITOR AND DISPLAY INFORMATION FROM A DATE INPUT SECTION

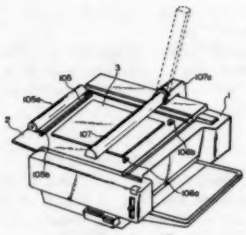
Yutaka Inoue, Urawa; Mitsuru Kurata, Kawasaki; Nobuhiro Kasama, Yokohama; Masao Hosaka, Sagamihara; Toshiaki Yagasaki, Hino; Hiroshi Tanioka, Tokyo, and Tadashi Yamakawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

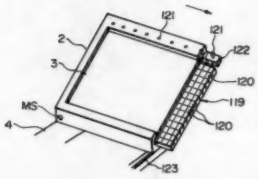
Filed Aug. 9, 1984, Ser. No. 639,142

Claims priority, application Japan, Aug. 16, 1983, 58-149369; Aug. 16, 1983, 58-149370; Aug. 17, 1983, 58-149122; Aug. 17, 1983, 58-149123; Aug. 31, 1983, 58-158052; Aug. 31, 1983, 58-158053; Aug. 31, 1983, 58-158054; Sep. 5, 1983, 58-161950; Sep. 27, 1983, 58-177037; Sep. 27, 1983, 58-177038; Sep. 27, 1983, 58-177039; Sep. 27, 1983, 58-177040; Oct. 1, 1983, 58-181829; Oct. 1, 1983, 58-181830; Oct. 14, 1983, 58-190984; Dec. 2, 1983, 58-226754

Int. Cl.[4] G03G *15/04*

U.S. Cl. 355—3 R 10 Claims





1. An image processing apparatus comprising:

inputting means for inputting data;

displaying means for displaying an image in response to an information signal from said inputting means;

an original plate for placing an original thereon;

a presser plate for pressing said original placed on said original plate;

exposing means for exposing said original pressed toward said original plate by said presser plate;

image processing means for processing an original image in response to reflected light from said original exposed by said exposing means and selectively forming said original and said displayed image on the basis of light provided when said displayed image is processed; and

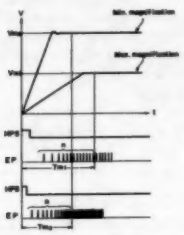
lighting means, provided at the back side of said displaying means, for lighting only portions of said displayed image at an exposure position, wherein said displaying means is arranged on the side of the pressing surface of said presser plate.

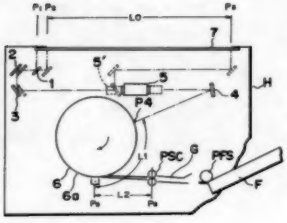
4,714,941

COPYING APPARATUS HAVING A CONTROLLED SCANNING SPEED ACCORDING TO A COPYING MAGNIFICATION

Toshio Yamagishi, Nara, and Katsuyoshi Fujiwara, Osaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 15, 1986, Ser. No. 852,210
Claims priority, application Japan, Apr. 16, 1985, 60-83263; Apr. 16, 1985, 60-83264
Int. Cl.[4] G03G 15/00
U.S. Cl. 355—8 3 Claims





1. A copying apparatus comprising:

original document scanning means for scanning an original document to be copied, said original document scanning means including a reciprocating optical unit and an original document platform or the like, to scan at a constant speed, with the scanning speed thereof being controlled according to copying magnifications;

means for preliminarily scanning by said original document scanning means before a copying exposure scanning at speeds corresponding to at least two different copying magnifications;

means for measuring an acceleration time of said original document scanning means from a home position to a reference position in a constant speed moving section corresponding to said at least two different copying magnifications by said preliminary scanning;

means for calculating an acceleration time corresponding to any required copying magnification based on information of the acceleration time corresponding to said at least two different copying magnifications; and

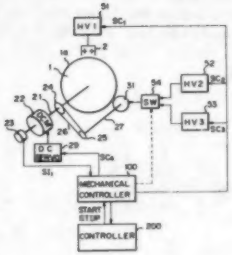
means for setting timing for feeding a leading edge of a copy paper sheet to a transfer position, based on a reference time obtained by adding time required for an exposure position on a photoreceptor drum to reach the transfer position, to said calculated acceleration time.

4,714,942

REVERSAL IMAGE DEVELOPMENT TYPE ELECTROPHOTOGRAPHIC PRINTING SYSTEM

Akio Nakanishi, Funabashi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 18, 1986, Ser. No. 875,669
Claims priority, application Japan, Jun. 18, 1985, 60-132530
Int. Cl.[4] G03G 15/00, 15/08
U.S. Cl. 355—14 R 17 Claims



1. A two component reversal image development type electrophotographic printing system comprising:

rotatable means having light sensitive means mounted thereon;

precharging means including:

a precharger provided adjacent to an outer surface of said rotatable means; and

a first power supply, connected to said rotatable means and said precharger, supplying a high voltage to said precharger and charging said light sensitive means to a predetermined voltage;

exposing means, connected to said light sensitive means, for exposing said charged light sensitive means to light beams for forming latent images in said charged light sensitive means;

developing means, connected to said light sensitive means, for developing images at portions of said light sensitive means on which said latent images are formed, said developing means including:

image developing roller means co-rotatable with said rotatable means and containing magnets and a sleeve covered thereon;

a second power supply, connected to said image developing roller means, for supplying a first bias voltage having a predetermined value which is equal to or greater than zero and having a polarity which is an inverted polarity of the high voltage from said first power supply to said image developing roller means for preventing a deposition of a printing medium on said light sensitive means until a portion of the light sensitive means precharged by the precharging means passes said image developing roller means; and

a third power supply, connected to said image developing roller means, for supplying a second bias voltage having a predetermined value and having the same polarity as the first power supply, to said image developing roller means for performing an image developing operation in a normal condition;

discharging means, connected to said light sensitive means, for discharging charges on said light sensitive means; and

controlling means, connected to said rotatable means and said image developing roller means, for controlling at least a start of said rotatable means and said image developing roller means, and energization and de-energization of said first, second and third power supplies, in a predetermined sequence in accordance with various positions of said precharging means, said image developing roller

means, and said discharging means, and a rotational speed of said rotatable means, in at least the start-up condition.

4,714,943

IMAGING DEVICE

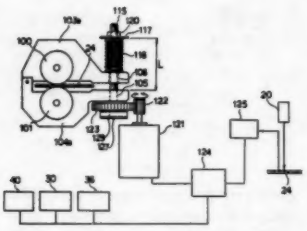
Kenji Sakakibara, Ichinomiya; Michitoshi Akao, Nagoya; Shigeyuki Hayashi, Nagoya, and Jun Sakai, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 4, 1987, Ser. No. 21,637

Claims priority, application Japan, Mar. 11, 1986, 61-51409; Mar. 11, 1986, 61-51410; Mar. 27, 1986, 61-43929[U]

Int. Cl.[4] G03B *27/32, 27/52*

U.S. Cl. 355—27 **13 Claims**



1. An imaging device comprising;

means for exposing a light on a photo and pressure sensitive recording sheet for forming a latent image thereon;

means for applying a pressure on said recording sheet for developing said latent image thereon; and

means for controlling a degree of pressing applied to said recording sheet by said pressure applying means.

4,714,944

VARIABLE-MAGNIFICATION COPYING MACHINE WITH AUTOMATIC MAGNIFICATION

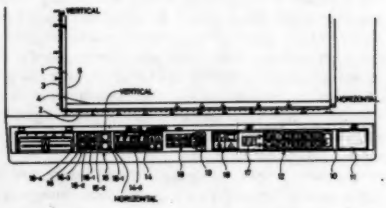
Syoichiro Yoshiura, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 697,013, Jan. 31, 1985, abandoned. This application Sep. 24, 1986, Ser. No. 910,863

Claims priority, application Japan, Jan. 31, 1984, 59-17396

Int. Cl.[4] G03B *27/52*

U.S. Cl. 355—55 **4 Claims**



1. A variable-magnification copying machine incorporating functions for executing a copying operation in response to a magnification set for selected copy paper sizes as compared to a draft paper of a given size comprising:

orthogonally disposed scales adapted for visually measuring the length of the horizontal and vertical edges of the draft paper and further adapted for indicating a correspondence between the size of the draft paper and one of a plurality of standard draft paper sizes;

key input means for inputting data denoting the length of the horizontal and vertical edges of the draft paper as visually measured along said orthogonally disposed means in a variable sizing mode and alternatively for inputting one of a plurality of standard draft paper sizes in a preset sizing mode;

means for selecting a copy paper size in said variable sizing mode;

calculating means, responsive to said key input means and said means for selecting a copy paper size, for computing a ratio between the inputted lengths of the horizontal and vertical edges of both the draft and copy papers in said variable sizing mode;

said calculating means alternatively computing a ratio between the inputted standard draft paper size and a selected copy paper size in said preset sizing mode;

selecting means, responsive to said calculating means, for selecting the smaller ratio of the computed lengths of the horizontal and vertical edges as the variable magnification in either of said variable sizing mode or said preset sizing mode; and

automatic setting means, responsive to said selecting means, for setting a copying magnification for the copying operation.

4,714,945

LIGHT EXPOSURE CONTROLLER

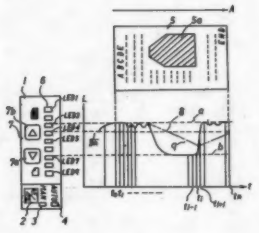
Katsuyoshi Fujiwara, Osaka, and Shunju Anzai, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 18, 1985, Ser. No. 810,244

Claims priority, application Japan, Dec. 20, 1984, 59-271468

Int. Cl.[4] G03B *27/72*

U.S. Cl. 355—69 **4 Claims**



1. A light exposure controller, comprising:

a lamp for illuminating an original document on a copy document table;

means for detecting a quantity of light reflected by said original document;

means for controlling a light volume of said lamp according to the detected quantity of light; and

mode selector means for selecting either of an automatic or manual exposure control for said lamp, wherein the light volume is set at a mean value of the light volume for the most recent automatic control mode copying operation when the automatic control mode is switched over to the manual mode.

4,714,946

CONTINUOUS FORM FEEDER FOR A REPRODUCING MACHINE AND PROCESS

Teddy A. Bajgert, Boulder; Neall H. Bunker; James L. Cochran, both of Longmont; Willis J. Duane, and Arturo Mojica, both of Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 27, 1985, Ser. No. 802,648

Int. Cl.[4] G03B *27/62*

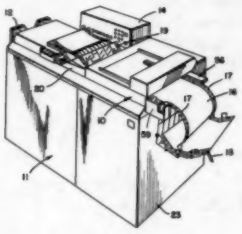
U.S. Cl. 355—75 **55 Claims**

1. A multipurpose document feeder for a reproducing machine including means for viewing a document and for forming an image thereof on a desired copy substrate, said document feeder comprising:

document feeding means selectively operable in a first mode wherein one or more individual document sheets are serially fed to said viewing means or in a second mode wherein said document comprises a continuous web which is incrementally advanced over said viewing means;

continuous web supporting means arranged adjacent said document feeding means for supporting a fanfolded stack of said web;

means for supporting said web supporting means for movement selectively between a first stored position, corresponding to said first mode, wherein it does not interfere with operation of said feeding means in said first mode of operation and a second operative position, corresponding to said second mode, wherein it is operative to support said web for feeding by said feeding means to said viewing means in said second mode of operation; and



control means responsive to the movement of said web supporting means between its respective first and second positions for automatically conditioning said feeding means to operate in its corresponding first or second mode of operation.

4,714,947

CONTACT PRINTER FOR PHOTOSENSITIVE MATERIALS

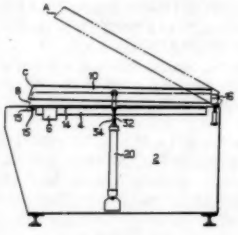
Fumihiko Nishida; Seiji Nanri, and Makoto Yahata, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jul. 17, 1986, Ser. No. 886,778

Claims priority, application Japan, Jul. 18, 1985, 60-110831[U]

Int. Cl.[4] G03B *27/04*

U.S. Cl. 355—95 **20 Claims**



1. A contact printer for printing from an original to photosensitive material, comprising:

a printing table for mounting the photosensitive material thereon, said table being adapted to move up and down;

a light source for exposing said photosensitive material through the original;

a light transmitting plate member having an effective printing area;

a frame member for supporting said light transmitting plate member;

a packing member disposed to be outside said effective area of said light transmitting plate member, for defining an airtight space between said printing table and said light transmitting plate member;

original moving means for moving said original in a plane adjacent to said printing table orthogonally in X-direction and Y-direction relative to said photosensitive material;

air supply means for blowing air into a space between said original and said photosensitive material to provide a laminar flow of air therein; and

frame member moving means for opening and closing said frame member relative to said printing table, said frame member moving means being adapted for moving said frame member between a first position at which said frame member is opened and a second position at which said airtight space is defined by said printing table, said light transmitting plate member, and said packing member, and for holding said frame member at a third position at which said frame member is slightly opened to be between said first and second positions so as to define a corresponding space between said original film and said photosensitive material after said printing table is moved downward, whereby said original can be moved in X-direction and Y-direction by said original moving means while said original is supported in said space by said laminar flow of air blown by said air supply means so that contact between the moving original and the photosensitive material is avoided.

4,714,948

HEMT WITH EPITAXIAL NARROW BANDGAP SOURCE/DRAIN CONTACTS ISOLATED FROM WIDE BANDGAP LAYER

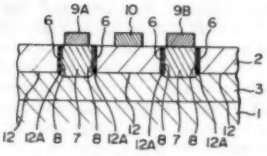
Takashi Mimura, Machida, and Satoshi Hiyamizu, Komae, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 371,505, Apr. 23, 1982, abandoned. This application Mar. 13, 1986, Ser. No. 839,826

Claims priority, application Japan, Apr. 23, 1981, 56-61702

Int. Cl.[4] H01L *29/205, 29/80*

U.S. Cl. 357—22 **4 Claims**



1. A semiconductor device comprising:

a first single crystalline semiconductor layer;

a second single crystalline semiconductor layer doped with N-type impurities, having an electron affinity less than that of said first single crystalline semiconductor layer, a heterojunction being formed between said first and second single crystalline semiconductor layers;

a gate electrode formed on said second single crystalline semiconductor layer;

an electron-storing layer for storing electrons and acting as a conduction channel, formed adjacent to said heterojunction and within said first single crystalline semiconductor layer, due to the difference in electron affinity between said first and second single crystalline semiconductor layers;

a pair of conduction layers comprising substantially the same semiconductor material as said first single crystalline semiconductor layer, being highly doped with N-type impurities, and extending through said second single crys-

talline semiconductor layer into said first single crystalline semiconductor layer to a depth level with the depth of said heterojunction and forming an epitaxial connection with said first single crystalline semiconductor layer;

an insulating layer, interposed between said conduction layers and said second single crystalline semiconductor layer, composed of oxide or nitride of said second single crystalline semiconductor layer; and

a pair of electrodes, respectively, formed on said pair of conduction layers and electrically connected to said conduction channel via said conduction layer, said pair of electrodes electrically connected to each other through said conduction channel.

4,714,949

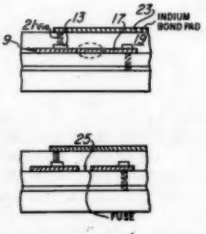
ELECTROSTATIC DISCHARGE PROTECTION USING THIN NICKEL FUSE

Arturo Simmons; Shawn T. Walsh, both of Garland, and Charles G. Roberts, McKinney, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 656,111, Sep. 28, 1984, abandoned. This application Sep. 12, 1986, Ser. No. 907,130

Int. Cl.[4] H01L *29/78, 27/14, 27/10, 27/02*

U.S. Cl. 357—23.13 **12 Claims**



1. A MIS array semiconductor device in which each device comprises:

(a) a semiconductor substrate,

(b) a first insulating layer on said substrate, and

(c) an electrically conductive layer on said insulating layer, said conductive layer being patterned into an MIS element, said element including a gate and a fuse, said first insulating layer forming the gate insulator and defining a first via therethrough associated with said MIS element, said fuse being a narrow portion of said conductive layer connected at one end to said gate and connected at the other end to said substrate through said first via, said gate connected to a bond pad, said narrow portion of width being sufficiently thin to blow the fuse with a voltage applied to said gate relative to said substrate that is below the minimum voltage required to damage said insulating layer or substantially move fixed charge in said insulating layer,

(d) whereby said fuse short circuits the MIS capacitor formed by said gate with said substrate until said fuse is blown.

4,714,950

SOLID-STATE PHOTO SENSOR DEVICE

Kazuhiro Kawajiri; Hiroshi Tamura; Haruji Shinada; Mitsuo Saito, and Yuzo Mizobuchi, all c/o Fuji Photo Film Co., Ltd., No. 798, Miyanodai,, Kaisei-machi, Ashigarakami-gun Kanagawa, Japan

Filed Jun. 27, 1985, Ser. No. 749,400

Claims priority, application Japan, Jul. 4, 1984, 59-137333

Int. Cl.[4] H01L *27/14, 31/00*

U.S. Cl. 357—30 **19 Claims**

1. A solid-state photo sensor device comprising:

a first electrode layer for allowing light to pass therethrough;

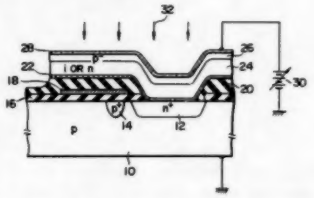
a first amorphous silicon layer of a first conductivity type disposed below said first electrode layer;

a second amorphous silicon layer of a second conductivity type, other than the first conductivity type, disposed below said first amorphous silicon layer;

said first and second amorphous silicon layers each containing impurity elements whose concentration ranges from about 0 molPPM to 200 molPPM;

said second amorphous silicon layer being disposed on a second electrode layer;

said second electrode layer overlying a first insulating layer except in an area where said second electrode layer is electrically connected to a first type impurity region, said



first type impurity region being disposed in a substrate and forming a p-n diode with said substrate;

a gate insulation layer overlying said substrate, except in said area where said second electrode layer is electrically connected to said first type impurity region;

a gate electrode being disposed between said gate insulation layer and said first insulation layer; and

a potential barrier region of a second type impurity being disposed in said substrate, separate from said first type impurity region,

wherein the device delivers photocarriers in the form of an electric current, excited at least in said second amorphous silicon layer,

and wherein the device also delivers photocarriers, in the form of an electric current, that are excited in said first amorphous silicon layer.

4,714,951

INTEGRATED CIRCUIT DEVICE WHICH INCLUDES A CONTINOUS LAYER WHICH CONSISTS OF CONDUCTING PORTIONS WHICH ARE OF A SILICIDE OF A REFRACTORY METAL AND INSULATING PORTIONS WHICH ARE OF AN OXIDE OF THE METAL

Annie Baudrant, St. Martin D'Heres, and Michel Marty, Grenoble, both of France, assignors to Societe pour d'Etude et la Fabrication de Circuits Integres Speciaux EFCIS, Grenoble, France

Division of Ser. No. 673,425, Nov. 20, 1984, Pat. No. 4,593,454. This application Feb. 26, 1986, Ser. No. 833,845

Claims priority, application France, Nov. 22, 1983, 8318565

Int. Cl.[4] H01L *29/78, 27/02, 23/48*

U.S. Cl. 357—67 **7 Claims**

1. An integrated circuit device including

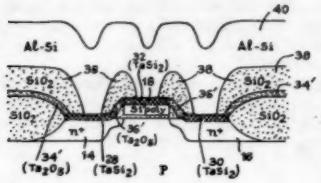
a semiconductive chip having a plurality of separate silicon surface regions to each of which a low resistance electrical connection is to be provided,

an insulating oxide layer overlying portions of the chip between said separate surface regions, and

a continuous layer overlying said chip consisting of conducting portions and insulating portions,

the conducting portions being of a silicide of a given refractory metal and contiguous to the silicon surface regions

for providing low resistance electrical connection thereto, and



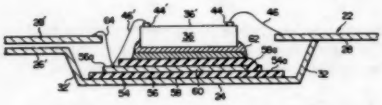
the insulating portions being of an oxide of the given metal and contiguous to the insulating oxide layer.

4,714,952

CAPACITOR BUILT-IN INTEGRATED CIRCUIT PACKAGED UNIT AND PROCESS OF FABRICATION THEREOF

Kouichi Takekawa, and Manabu Bonkohara, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Oct. 30, 1985, Ser. No. 792,971
Claims priority, application Japan, Nov. 1, 1984, 59-230954
Int. Cl.[4] H05K *03/46*
U.S. Cl. 357—75 **22 Claims**



1. A capacitor built-in integrated circuit packaged unit comprising an electrically conductive support member having an extensive area larger than said capacitor, integrated circuit,

(1) first and second lead elements associated with said conductive support member, said first lead element being electrically connected to said conductive support member and said second lead element being electrically isolated from said conductive support member,

(2) a stack having a plurality of layers and comprising a first insulating layer of a highly dielectric material formed on said conductive support member, a first electrically conductive layer formed on said first insulating layer, said first insulating layer having a portion exposed by said first electrically conductive layer, a second insulating layer formed on said first electrically conductive layer and having a portion directly lying on the exposed portion of said first insulating layer, said first electrically conductive layer as a whole being less extensive than said first insulating layer and having a portion exposed by said second insulating layer, a second electrically conductive layer formed on said second insulating layer, said second electrically conductive layer as a whole being less extensive than said second insulating layer and than said first electrically conductive layer, and a layer of an electrically conductive adhesive material formed on the second electrically conductive layer,

(3) a semiconductor integrated circuit chip having first and second electrodes which are electrically isolated from each other, said semiconductor integrated circuit chip having a surface portion bonded to said second electrically conductive layer via said electrically conductive adhesive material,

(4) first coupling means electrically connecting the first electrode to said first lead element, and

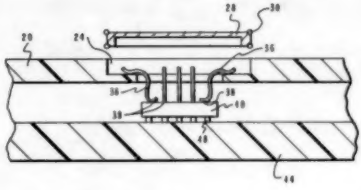
(5) second coupling means electrically connecting the second electrode to the exposed portion of said first electrically conductive layer and to said second lead element.

4,714,953

WELDED WIRE COOLING

Marvin L. Buller, Austin, Tex.; Douglas L. Lumbra, St. Albans, Vt.; Douglas W. Phelps, Burlington, Vt.; Sigvart J. Samuelsen, Burlington, Vt., and William C. Ward, Burlington, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 12, 1986, Ser. No. 861,799
Int. Cl.[4] H01L *23/34, 23/36*
U.S. Cl. 357—81 **6 Claims**



1. A semiconductor packaging configuration comprising:

a substrate;

a semiconductor device mounted on the substrate;

a cover attached to the substrate, overlying the semiconductor device; and

a plurality of metallic filaments directly connecting preselected heat generating areas on semiconductor material in the semiconductor device to the cover, for dissipating heat generated in the semiconductor device.

4,714,954

READ START PULSE GENERATOR FOR TIME BASE CORRECTOR

Tadaaki Yoshinaka, and Takao Inoue, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 5, 1986, Ser. No. 826,223
Claims priority, application Japan, Feb. 16, 1985, 60-28913
Int. Cl.[4] H04N *9/475*
U.S. Cl. 358—19 **8 Claims**

3. In a read clock generator for a time base corrector having:

a synchronizing signal generator including a horizontal synchronizing phase adjusting device, responsive to a reference pulse signal including a reference synchronizing signal, for generating a read synchronizing signal adjustable in phase relative to the reference synchronizing signal,

a color subcarrier signal generator including a subcarrier phase adjusting device, responsive to the reference pulse signal including a reference burst signal, for generating a burst signal adjustable in phase relative to the reference burst signal, and

a read signal generator including a hue adjusting device, responsive to the adjusted burst signal, for generating a read subcarrier signal and a read clock signal both adjustable in phase relative to and synchronized with the adjusted burst signal;

a read start pulse generator of color subcarrier synchronizing phase controller type, which comprises:

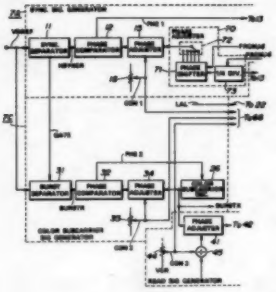
a switching circuit responsive to the adjusted synchronizing signal for outputting a trigger signal, the phase of the trigger signal being delayed a half period of the subcarrier signal for each horizontal scanning line;

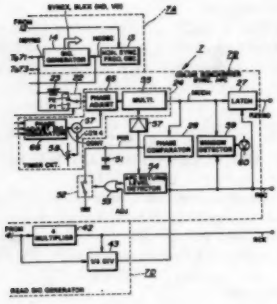
a timer circuit including a horizontal synchronization color subcarrier phase adjusting device, responsive to the trigger signal, for outputting an adjustable timer output, the

timer time thereof being approximate to a timing at which a read start pulse signal is generated;

a latch circuit responsive to the timer output for latching a logical level of the timer output at a timing at which the adjusted burst signal is zero in voltage level and for generating the start pulse signal in synchronization with the read subcarrier signal;

a phase comparator for making a phase comparison between the timer output and the read subcarrier signal and outputting a phase error signal between the two to said timer circuit to control the timer time so that the phase error signal becomes zero; and





means for automatically adjusting the phase of the timer output by cancelling a phase offset between the read synchronizing signal and the read subcarrier signal due to the adjusted read synchronizing signal and the adjusted read subcarrier signal;

whereby once the timer circuit is adjusted, it is unnecessary to readjust the adjusted timer time even after the horizontal synchronization phase adjusting device, the subcarrier phase adjusting device, and the hue adjusting device have been adjusted.

4,714,955

SOLID-STATE COLOR IMAGE PICKUP APPARATUS

Ryuji Nishimura; Minoru Kato, both of Yokohama; Masaru Noda, Kanagawa, and Takuya Imaide, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 5, 1986, Ser. No. 927,140

Claims priority, application Japan, Nov. 6, 1985, 60-247052; Jan. 20, 1986, 61-7914

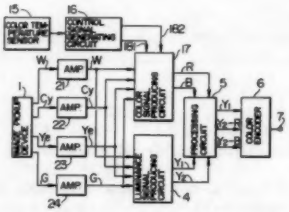
Int. Cl.[4] H04N *9/07, 9/077*

U.S. Cl. 358—48 **10 Claims**

1. A signal processing apparatus for obtaining a video signal in which color aliasings were suppressed for a color video camera having an image pickup device consisting of a number of photoelectric converting elements which are two-dimensionally arranged and four kinds of color separation optical filters which are repetitively arranged on the surfaces of said photoelectric converting elements in accordance with a predetermined order, said signal processing apparatus comprising:

an image pickup device for outputting a first signal, a second signal, a third signal, and a fourth signal respectively corresponding to said four kinds of color separation optical filters; and

color signal producing means for producing a first color signal and a second color signal by processing said first to fourth signals on the basis of arithmetic operations of the following expressions:



$$C_1=\alpha S_1-\beta S_2+\gamma S_3-\delta S_4$$

$$C_232\ \alpha' S_1+\beta' S_2-\gamma' S_3-\delta' S_4$$

wherein respective arithmetic operational ratios α, β, γ, δ, α', β', γ', and δ' of said first and second color signals are set so as to substantially satisfy the following condition

$$\alpha S_1+\beta S_2=\gamma S_3+\delta S_4 \text{ or } \alpha' S_1+\gamma' S_3=\beta' S_2+\delta' S_4.$$

4,714,956

COLOR DISPLAY APPARATUS AND METHOD THEREFOR

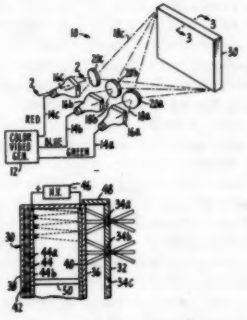
Ronald L. Yin, 2045 Sea Cliff Way, San Bruno, Calif. 94066

Continuation-in-part of Ser. No. 422,741, Sep. 24, 1982, Pat. No. 4,562,461, which is a continuation-in-part of Ser. No. 309,820, Oct. 8, 1981, abandoned. This application Dec. 9, 1985, Ser. No. 806,673

The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.

Int. Cl.[4] H04N *5/74*

U.S. Cl. 358—60 **21 Claims**



1. A method of converting a plurality of electrical signals into a color visual display, said method comprising the steps of:

generating a plurality of beams of electrons;

modulating each beam of electrons by one of said plurality of

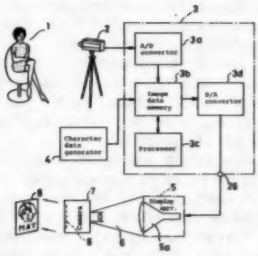
electrical signals to produce a plurality of beams of modulated electrons;
converting each beam of modulated electrons into a beam of modulated light to produce a plurality of beams of modulated light;
directing said plurality of beams of modulated light at a two-dimensional photocathode screen in an evacuated envelope;
optically masking each beam of modulated light such that each beam of modulated light impinges a different location on said photocathode screen, said screen having a plurality of different locations;
releasing electrons from said photocathode screen in response to said plurality of beams of modulated light impinging thereon;
accelerating said electrons to a two-dimensional phosphor screen in said envelope, said phosphor screen having a plurality of different phosphor compositions, in a plurality of different locations, each phosphor composition in a different location releasing visible light of a different color in response to electrons impinging thereon;
releasing visible light from said phosphor screen in response to electrons impinging thereon; and
moving said plurality of beams of modulated light to impinge said photocathode screen in different locations whereby the movement of said plurality of beams of modulated light forms said color visual display.

4,714,957

APPARATUS AND METHOD FOR MAKING A STAMP

Hiroji Takano, Yawata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 29, 1986, Ser. No. 901,786
Claims priority, application Japan, Sep. 2, 1985, 60-193510
Int. Cl.[4] H04N *1/032, 1/387*
U.S. Cl. 358—93 **8 Claims**



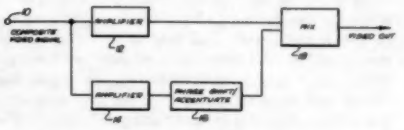
1. Method for making a stamp comprising:
step of producing image data signal from an object,
step of processing said image data signal to produce a signal of line pattern of edges of said object,
step of producing an optical image of photoactive rays from said signal of line pattern,
step of irradiating a photosensitive resin layer formed on a substrate with said photoactive rays of said optical image, and
step of developing a latent image made by said irradiation on said photosensitive resin layer to produce a stamp of said line pattern.

4,714,958

VIDEO PROCESSOR

Gary L. Holz, San Diego, and Walter M. Foster, El Cajon, both of Calif., assignors to BMP, Las Vegas, Nev.

Filed Nov. 14, 1983, Ser. No. 550,880
Int. Cl.[4] H04N *5/14*
U.S. Cl. 358—166 **11 Claims**



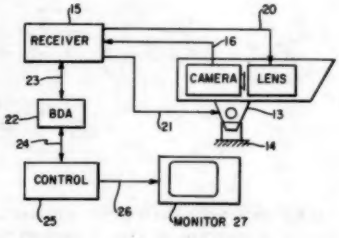
1. A video processor for improving picture quality comprising:
input means for receiving a composite video signal having a varying magnitude level and dividing the video signal into first and second video signals;
modification means for receiving the second video signal and selectively accentuating the magnitude of the second video signal between relatively low magnitude portions and relatively high magnitude portions, wherein the modification means includes phase shift means for selectively phase shifting portions of the second video signal with respect to the first video signal to provide a modified second video signal; and
mixing means for combining the modified second video signal with the first video signal to provide an accentuated video output signal.

4,714,959

BI-DIRECTIONAL AMPLIFIER FOR CONTROL AND VIDEO SIGNALS IN A CLOSED CIRCUIT TELEVISION SYSTEM

Yacov A. Pshtissky, Bayside, N.Y., assignor to Vicon Industries, Inc., Melville, N.Y.

Filed Jul. 22, 1986, Ser. No. 888,767
Int. Cl.[4] H04N *1/00, 5/14, 5/228, 5/222*
U.S. Cl. 358—184 **18 Claims**



1. A bi-directional amplifier for use in a closed circuit T.V. system in which video signals from a camera and camera control signals from a control console are transmitted between said camera and said control console, said camera being mounted remotely from said console and coupled thereto by a single link, said video signal including a picture information portion and a vertical back porch, said control signals being placed on said single link during said vertical back porch of said video signal, said system further including a receiver for receiving said camera control signals and for generating signals for controlling said camera, said bi-directional amplifier comprising:
means for detecting a start pulse from said receiver associated with the start of said vertical back porch;

sample and hold means for detecting a d.c. level of said vertical back porch; and

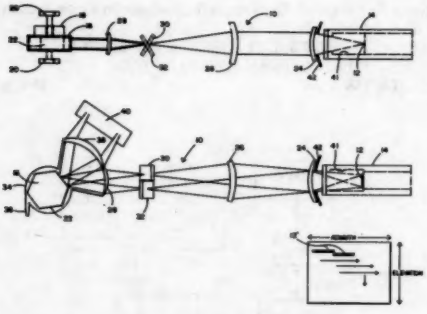
switch means comprising a first switch for transmitting said video signal from said camera to said control console during said picture information portion of said video signal and not transmitting said video signal from said camera during said back porch, second switch means for coupling the output of said sample hold to said control console during said vertical back porch of said video signal for maintaining said d.c. level and not coupling the output of said sample and hold to said control console during said picture information portion and third switch means for coupling said control signals to said camera during said vertical back porch and not coupling said control signals to said camera during said picture information portion.

4,714,960

TELEVISION RATE OPTICAL SCANNER

Peter Laakmann, Highland Dr., The Highlands, Seattle, Wash. 98177

Filed Jun. 3, 1985, Ser. No. 740,829
Int. Cl.[4] H04N *3/08*
U.S. Cl. 358—206 **26 Claims**



1. An afocal opto-mechanical scanner configured to produce television rate two-dimensional scans; the scanner comprising:

a multifaced polygon mirror for spinning around an axis centered and parallel to the mirror faces and defining a first scan direction for optical energy;

a second scan mirror scanning in a second scan direction substantially orthogonal to said first scan direction;

an optical relay between said first and second scan mirrors relaying the optical energy between the first scan mirror and the second scan mirror to create a non-astigmatic two-dimensional scan;

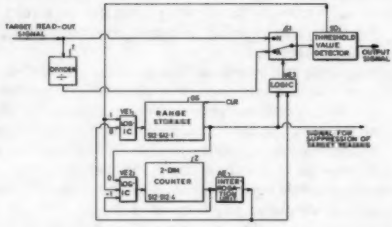
an enclosure for housing said polygon mirror substantially at atmospheric pressure when at rest and providing a reduction in operating pressure through centrifugal pumping action when at operating speed without requiring a separate pump.

4,714,961

PROCESS AND CIRCUIT ARRANGEMENT FOR THE REMOTE PICK UP AND REPRODUCTION OF IMAGES OF STATIC OR MOVING OBJECTS

Heinz-Günter Haubold, Jülich, and Peter Hiller, Düren, both of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Fed. Rep. of Germany

Filed May 13, 1986, Ser. No. 862,764
Claims priority, application Fed. Rep. of Germany, May 17, 1985, 3517737
Int. Cl.[4] H04N *5/235*
U.S. Cl. 358—209 **10 Claims**



1. A process for the remote pickup and reproduction of images of static or dynamic objects, comprising the steps of:

registering individual images of an object in a standard image pickup cycle with a pickup camera;

integrating accumulation of electric charges upon a target of said pickup camera representing image-density characteristics of each of said individual images;

line-scan reading said target and generating electrical signals representing the integrated electric charges;

interrupting the line-scan reading of the electric charges of at least a region of said target at which accumulation of said charge is less than a predetermined threshold charge level for a predetermined number of said standard image pickup cycles following the interruption;

following said predetermined number of standard image pickup cycles, recommencing the line-scan reading of said electric charges while normalizing the read level of charges at said region in the production of said signals from said electric charges;

storing values representing said signals; and

reproducing images by outputting the stored values such that when an interruption of line-scan reading of said electric charges directly follows a preceding said interruption, a value representing a signal previously stored is used in the reproduction of an image during the following interruption,

said predetermined number of said standard image pickup cycles for which the reading of electric charges is interrupted is selected as a function of the speed of the object whose images are registered.

4,714,962

DUAL ELECTRONIC CAMERA, PREVIEWING, AND CONTROL

Alfred B. Levine, 2924 Terrace Dr., Chevy Chase, Md. 20815

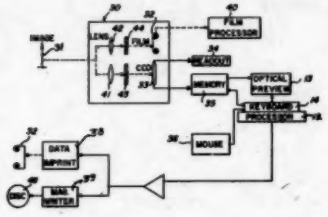
Division of Ser. No. 834,923, Feb. 28, 1986, which is a continuation-in-part of Ser. No. 617,344, Jun. 4, 1984, Pat. No. 4,588,282. This application Feb. 17, 1987, Ser. No. 15,143
Int. Cl.[4] H04N *7/18*
U.S. Cl. 358—209 **20 Claims**

1. A dual camera for concurrently electronically imaging objects and photographically imaging said objects;

said camera having an electro-optic sensor and associated electronic memory with capability to sequentially image and record a series of still electronic images;

said camera having accomodation for receiving conven-

tional photographic film and means for concurrently exposing said film to sequentually record a series of still latent images, with each film latent image corresponding to a different one of the recorded electronic images;



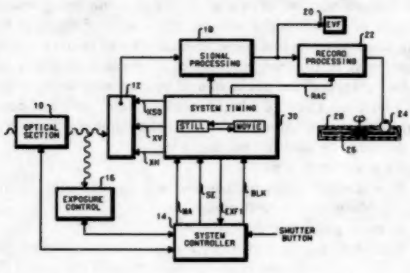
and means for reading out and displaying any one of the electronic images prior to development of the photographic film, thereby to display the content of the corresponding one of the latent images in the photographic film prior to development of the photographic film.

4,714,963

ASYNCHRONOUS STILL TIMING FOR A VIDEO CAMERA PRODUCING MOVIE OR STILL IMAGES

Richard M. Vogel, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 3, 1986, Ser. No. 882,121
Int. Cl.[4] H04N *3/14*
U.S. Cl. 358—213.26 **11 Claims**



1. A still video camera of the type having an image sensor that generates a charge pattern in response to image light from an object and operates thereupon either as a signal source for a movie image, according to a specific image repetition rate, or as a signal source for a still image, the camera further including a release switch for initiating a still exposure period, said camera comprising:

means for generating a continuous stream of movie phasing signals for operating upon the charge in the image sensor at a rate that is substantially greater than the image repetition rate;

transfer means for applying said movie phasing signals to the image sensor when the image sensor operates as a signal source for a movie image;

means for generating a still phasing signal for operating the image sensor as a signal source for a still image; and

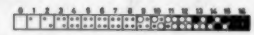
means responsive to actuation of the release switch for interrupting the application of said movie phasing signals to the image sensor and for substituting therefor said still phasing signal synchronously with respect to said movie phasing signals and asynchronously with respect to said image repetition rate.

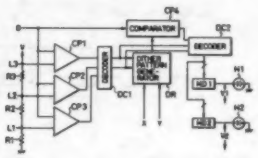
4,714,964

INTERMEDIATE GRADIENT IMAGE FORMING METHOD

Takashi Sasaki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 752,532, Jul. 8, 1985, abandoned. This application Dec. 23, 1986, Ser. No. 946,098
Claims priority, application Japan, Jul. 13, 1984, 59-146207
Int. Cl.[4] H04N *1/23*; G01D *15/16*
U.S. Cl. 358—298 **8 Claims**





1. A method of reproducing an original image by providing a half-tone image with an optical reflection density range substantially the same as that of the original image, utilizing dots the optical reflection density of which is modulated in accordance with a predetermined modulation technique, the method comprising the steps of:

providing coloring agents having at least two different concentrations;

forming dots on a recording surface using the coloring agents, wherein dots of at least two sizes can be used for each coloring agent, the optical reflection density of the maximun-size dots formed using the minmum-concentration coloring agent being higher than the optical reflection density of the minimum-size dots formed using the maximum-concentration coloring agent;

locating the dots on the recording surface in a matrix which represents an element of the picture and has a plurality of elementary areas, each of which is available for the formation of dots therein; and

selecting for each elementary area one of (a) no dot, (b) the minimum-size dot of the minimum-concentration coloring agent, (c) the minimum-size dot of the maximum-concentration coloring agent, (d) the maximum-size dot of the minimum-concentration coloring agent and (e) the maximum-size dot of the maximum-concentration coloring agent, in the named order in response to increasing optical reflection density of the image, wherein the selection is performed by comparing the optical reflection density level of the image with a reference level that is varied from one elementary area to another.

4,714,965

WRITE CLOCK PULSE GENERATOR USED FOR A TIME BASE CORRECTOR

Tadaaki Yoshinaka; Takao Inoue, and Kazuo Tomita, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 11, 1985, Ser. No. 807,745
Claims priority, application Japan, Dec. 25, 1984, 59-279427
Int. Cl.[4] H04N *9/89, 5/85, 5/78*
U.S. Cl. 358—320 **8 Claims**

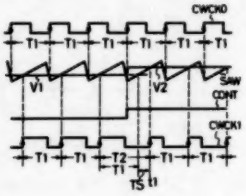
1. An apparatus for processing a plurality of component video signals which originally each extended over a horizontal interval and which have been time-compressed and arranged in sequence in one horizontal interval of said component video signals, each of said time-compressed component video signals starting at a respective starting position within the respective

horizontal interval that is different from the starting position of another of said time-compressed component video signals in said respective horizontal interval, said apparatus comprising:

means for generating a sampling clock pulse;

sampling means for sampling said time-compressed component video signals at times determined by said sampling clock pulse and producing sampled time-compressed component video signals;

means for time-expanding said sampled time-compressed component video signals from said sampling means;



control signal generator means for generating a control signal representing said different starting positions of said time-compressed component video signals, respectively, within each said horizontal interval; and

phase shifter means for shifting a phase of said sampling clock pulse in response to said control signal so that said sampling clock pulse is synchronized with each of said time-compressed component video signals at the respective starting position thereof.

4,714,966

ELECTRONIC PHOTOGRAPHY SYSTEM WITH STILL AND MOTION PICTURE MODES

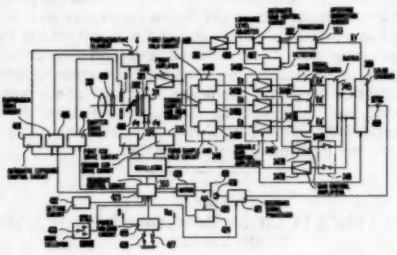
Syuichiro Saito, Kanagawa, and Tadashi Okino, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha

Filed Dec. 8, 1983, Ser. No. 559,221

Claims priority, application Japan, Dec. 14, 1982, 57-218876

Int. Cl.[4] H04N *5/238, 5/781*

U.S. Cl. 358—335 **30 Claims**



23. An image pick-up apparatus, comprising:

(a) image pick-up means for converting an image of an object into a picture image signal;

(b) control means for controlling the level of picture image signal so it appears at a predetermined level;

(c) indication means for indicating the amount of picture image signal to be picked up by the image pick-up means; and

(d) characteristic changing means for changing response characteristics of the control means according to the output of the indication means.

4,714,967

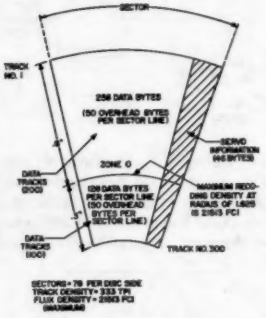
BINARILY RELATED VARIABLE RATE RECORDER

John F. Bizjak, Porto Alegre, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 14, 1985, Ser. No. 798,043

Int. Cl.[4] G11B *5/09*

U.S. Cl. 360—48 **3 Claims**


SECTOR
TRACK NO. 1
256 DATA BYTES
(50 OVERHEAD BYTES PER SECTOR LINE)
SERVO INFORMATION (NO BYTES)
ZONE 0
DATA TRACKS (000)
128 DATA BYTES PER SECTOR LINE (50 OVERHEAD BYTES PER SECTOR LINE)
MAXIMUM RECORDING DENSITY AT RADIUS OF 1.825 IS 2163 FCI
DATA TRACKS (000)
TRACK NO.300
SECTORS = 70 PER DISC SIDE
TRACK DENSITY = 333 TPI
FLUX DENSITY = 2163 FCI

1. For use with a computer disc having a format which is such that the data stored, or to be stored thereby, is arranged in generally pie-shaped sectors, said sectors being divided into at least two radially disposed recording zones for recording non-interleaved data in either said zone, each said zone having a respective number of tracks, the first zone being radially outward of the second zone, and the tracks of the first zone being adapted to record respective full blocks of data, said full blocks being respectively comprised of the same given number of data bytes, and the tracks of said second zone being respectively adapted to record half-blocks of data, said half-blocks being respectively comprised of half the number of data bytes which comprise said full blocks,

apparatus comprising

a. means for receiving data and disc storage address information from a host computer,

b. microprocessor means

c. a random access memory for use in controlling the flow of data from said host computer to said computer disc,

d. magnetic head means, and

e. means for controlling the positioning of said magnetic head means relative to said disc, said microprocessor means being connected to said means for receiving and said means for controlling head positioning for positioning said magnetic head means in accordance with said address information and, depending on whether recording is to be effected in a first or second zone of said disc, for causing data to be withdrawn from said random access memory in full or successive half blocks thereof, said apparatus further comprising means for providing first and second clocking signals corresponding respectively to the recording of full and half-blocks of data, said first clocking signal being different in frequency from said second clocking signal,

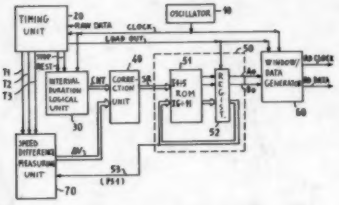
said means for receiving data and disc storage address information receiving data bytes comprised of parallel arrangements of bits, and said apparatus further comprising means for receiving and converting the output of said random access memory to a serial bit format, said clocks being applied to said means for receiving and converting for operating that means selectively at the frequency of said first and second clocking signals.

4,714,968

DIGITAL APPARATUS FOR DATA RECOVERY SYSTEM

Bonifacio Troletti, Boario Terme, Italy, assignor to Honeywell Information Systems Italia, Caluso, Italy

Filed Mar. 3, 1986, Ser. No. 835,415
Claims priority, application Italy, Mar. 21, 1985, 20007 A/85
Int. Cl.[4] G11B 5/09
U.S. Cl. 360—51 3 Claims



1. Digital apparatus for a data recovery system wherein the data is read out from a moving magnetic media and is affected by a speed error and by peak shift, said system comprising a unit for measuring the duration of intervals between first and second subsequently read out pulses, a speed correcting unit for converting the measured duration of said intervals into a duration corrected for errors in speed, a peak shift recovery unit for generating signals identifying, depending on the peak shift of a first pulse and the corrected duration of a following interval, a nominal duration of said following interval and the peak shift of the second pulse ending said following interval, said digital apparatus comprising:

means for receiving a binary signal representative of the peak shift direction of each subsequent read out pulse;

a first counter for counting a preestablished number of subsequent read out pulses;

a second counter coupled to said first counter to receive said binary signal to effect the algebric sum of the peak shift direction of said preestablished number of read out pulses and to generate a binary code representative of peak shift difference; and,

circuit means having outputs and inputs coupled to receive said binary code from said second counter and a speed error code fed back from said outputs which is representative of a previously measured speed error, said circuit means generating a new, updated speed error code, as a function of said binary code and said previously generated speed error code, said circuit means including means connected to said outputs for applying said updated speed error code to said speed error correcting unit and to said inputs of said circuit means.

4,714,969

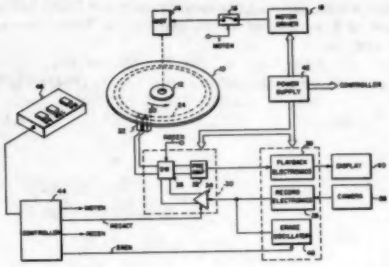
METHOD AND APPARATUS FOR ERASING A SIGNAL RECORDED ON A MAGNETIC DISK

Gene L. Bischoff, Elba, and James E. Elly, Buffalo, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 16, 1985, Ser. No. 776,237
Int. Cl.[4] G11B 5/03, 15/48
U.S. Cl. 360—66 12 Claims

1. A method of erasing a signal recorded on a recirculating track on a rotating magnetic medium, said method comprising the steps of:

generating an alternating current erasing signal; and



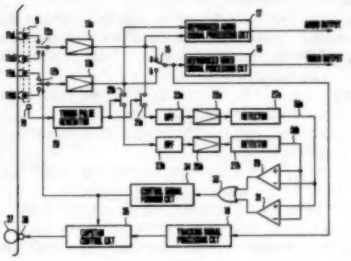
decelerating the medium while applying said erasing signal to the track during an erasing interval that is substantially coterminous with said deceleration of the medium.

4,714,970

REPRODUCING APPARATUS HAVING RECORDING SPEED DISCRIMINATING SYSTEM

Hiroo Edakubo, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1986, Ser. No. 855,172
Claims priority, application Japan, Apr. 25, 1985, 60-087613
Int. Cl.[4] G11B 15/44; H04N 5/782
U.S. Cl. 360—73 21 Claims



1. A reproducing apparatus for reproducing information signals from a tape-shaped recording medium on which a plurality of pilot signals of different frequencies for tracking control and information signals are recorded in superimposing relation, comprising:

(a) transporting means for transporting said tape-shaped recording medium selectively at one of at least two different running speeds for the purpose of reproducing said information signals;

(b) a pair of head means for reproducing said information signals recorded on said tape-shaped recording medium, said pair of head means including at least one rotating head, respectively;

(c) a pair of separation means for respectively separating, from a signal by each of said pair of head means, a predetermined frequency component related to said plurality of pilot signals;

(d) comparison means for comparing the levels of signals produced from said pair of separation means; and

(e) discriminating means for discriminating whether or not transporting speed of said transporting means is coincident with a transporting speed employed in recording said information signals, said discrimination being made on the basis of an output of said comparison means.

4,714,971

METHOD AND APPARATUS FOR REPRODUCING SIGNALS HAVING IMPROVED ROTARY HEAD TRACKING CONTROL

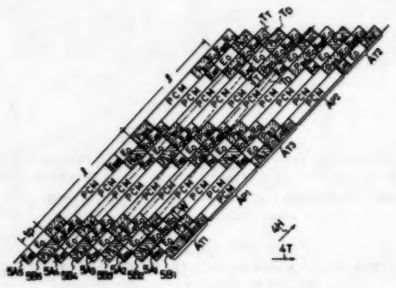
Hiraku Sigiki, Saitama; Makoto Yamada, and Shinji Miyamori, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 769,422

Claims priority, application Japan, Sep. 7, 1984, 59-187368

Int. Cl.[4] G11B *5/584, 5/09, 15/467*

U.S. Cl. 360—77 6 Claims



1. A method for reproducing signals recorded in a plurality of slant tracks on a recording medium by a rotary head, the signals in the tracks containing a digital information signal in a first predetermined area on said slant tracks and a tracking control signal including a tracking pilot signal and a signal used for erasing a previously recorded signal in a second predetermined area, comprising the steps of:

reproducing the tracking pilot signals recorded at respective second predetermined areas from both tracks adjacent a track being traced by a rotary head to provide levels of said tracking pilot signals;

comparing said levels of said tracking pilot signals reproduced from said adjacent tracks;

generating a head tracking signal in response to said level comparison;

controlling a tracking alignment of the rotary head relative to said slant tracks in response to said head tracking signal;

detecting the level of said tracking control signal recorded in said second area of said track being traced; and

adjusting the level of said head tracking signal in response to said detected level of said tracking control signal so as to accurately track said track being traced.

4,714,972

HOUSING FOR A MAGNETIC DISK MEMORY HAVING A DISK PACK SEAT AT OPPOSITE SIDES OF THE DISK PACK

Johann Biermeier, Munich, and Wilhelm Brand, Rosenheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 29, 1985, Ser. No. 696,203

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1984, 3404223

Int. Cl.[4] G11B *5/012, 5/54*

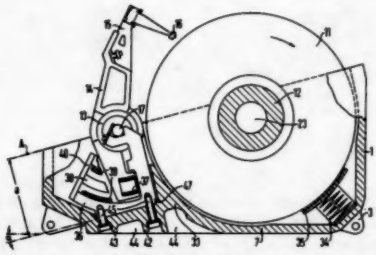
U.S. Cl. 360—97 10 Claims

1. A housing for a magnetic disk memory which comprises a disk pack including an axial spindle rotationally seated at opposite sides thereof in the housing and driven by a motor internal of the disk pack and a magnetic head rotational positioner apparatus having an axis of rotation parallel to the axis of rotation of said disk pack, said housing comprising:

a support shell and a cover mating to said support shell along a parting line spaced from and parallel to the axis of rotation of said disk pack;

said shell comprising an end wall extending at a predetermined acute angle with respect to said parting plane and first and second lateral walls extending perpendicular to said end wall and each defining a respective spindle bearing region within said support shell, said regions each including means for rotationally supporting said spindle;

said end wall including an attachment surface for said rotational positioner extending parallel to said parting plane and spaced therefrom a predetermined distance to define



the emmersion depth of said rotational positioner into said supporting shell;

said end wall comprising a plurality of projecting webs on the exterior thereof extending essentially perpendicular to said attachment surface and transversely of said end wall; and

means extending through said projecting webs for attaching said rotational positioner to said attachment surface.

4,714,973

SHUTTER ASSEMBLY FOR USE IN A DISC CARTRIDGE

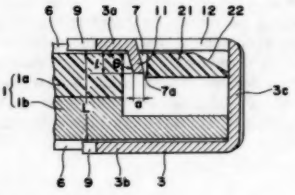
Yoshitake Kato; Minoru Fujita, both of Ibaragi, and Hiroshi Maruyama, Toride, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed May 9, 1986, Ser. No. 861,422

Claims priority, application Japan, May 9, 1985, 60-96599; May 9, 1985, 60-96600

Int. Cl.[4] G11B *23/03*

U.S. Cl. 360—133 9 Claims



1. A disc cartridge comprising:

a cartridge case comprising a first half case and a second half case, a drive shaft insertion opening defined in a central portion of said cartridge case, a shallow recess defined in a front portion of each half case, corresponding head accessing openings defined in each of said shallow recesses and a guide slot provided on at least one of said first half case and said second half case near a front edge of said cartridge case extending parallel to said front edge of said cartridge case,

a magnetic disc rotatably mounted in said cartridge case; and

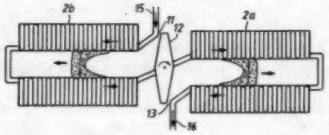
a shutter slidably mounted on said cartridge case for opening and closing said head accessing openings, movable along said respective guide slot, said shutter being formed in a general U character shape comprising first and second parallel flat plates joined by a connecting plate, said shutter presenting an open end for insertion of said shutter on

said cartridge case, each of said first and second flat plates being provided with openings which coincide with said head accessing openings during opening of the shutter, said shutter being provided with at least one projection provided on at least one of said first and second flat plates closely positioned to said connecting plate extending angularly inward relative to the other of said respective plates, said at least one projection including an elongated portion terminating at a free end, said elongated portion extending at an obtuse angle from said flat plate toward said connecting plate, said projection being made of a resin material which allows said projection to temporarily deform as the shutter is mounted on said cartridge case and to spring back to be captured in one of said guide slots.

4,714,974
CURRENT LIMITER

Emile Schreurs; Stefan Joader, and Stefan Valdemarsson, all of Västerås, Sweden, assignors to Asea Aktiebolag, Västerås, Sweden

Filed Dec. 22, 1986, Ser. No. 944,528
Int. Cl.⁴ H01H *9/30, 33/00*
U.S. Cl. 361—12 **10 Claims**



1. A current limiter comprising a contact means having at least two cooperating contacts at least one of which being movable, connecting members for connecting the current limiter into a circuit, and at least two substantially parallel, resistive runner rails adjacent to the contact means, said runner rails causing the arc produced upon contact opening when a short-circuit current flows in the circuit, under the influence of the magnetic field generated by the current, to move away from the contact means with the foot points of the arc running along the rails, an increasing resistance being inserted into the circuit, each runner rail comprises an insulated tape made of an electrically conductive material and being folded and packed to form a solid resistance package, the confronting surfaces of the two runner rails being at least partially uninsulated to form running paths for the foot points of the arc.

4,714,975
SELF-CONTAINED GROUND FAULT TEST FEATURE IN CIRCUIT BREAKER

Robert F. Dvorak, Mount Vernon, Iowa, assignor to Square D Company, Palatine, Ill.

Filed Apr. 5, 1985, Ser. No. 720,130
Int. Cl.⁴ H02H *3/16*
U.S. Cl. 361—44 **4 Claims**

1. An electric circuit breaker having the capability to detect the occurrence of a ground fault, said circuit breaker being connected to a phase conductor, said circuit breaker comprising:

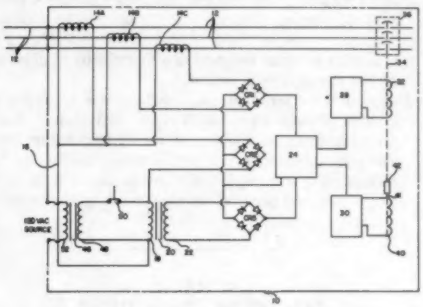
a pair of separable contacts;

trip means connected to said contacts to separate said contacts upon the occurrence of an overcurrent;

an indicator means to indicate the occurrence of a ground fault upon the receipt of a signal;

signal means for sending a signal to said indicator means upon the occurrence of a simulated or actual ground fault, said signal means comprising a first transformer having a primary winding and a secondary winding, the primary winding being connected with the phase conductor, the secondary winding being electrically connected to said indicator means, wherein a current is induced in the secondary winding of said first transformer upon the occurrence of a simulated or actual ground fault; and

a simulator to simulate a ground fault to activate said signal means by supplying a current to the primary winding of

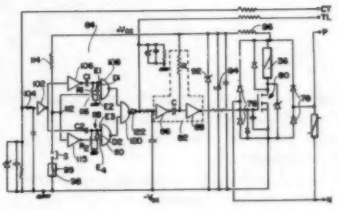


said first transformer, said simulator comprising a second transformer, having a primary winding and a secondary winding, the second transformer secondary winding being electrically connected to the first transformer primary winding.

4,714,976
MULTIPOLE BREAKING DEVICE WITH REMOTE CONTROL

Bernard Pin, Meylan, France; André Delbosse, and Ivan Dubreucq, both of Brussels, Belgium, assignors to Merlin Gerin, France

Filed Mar. 17, 1986, Ser. No. 840,085
Claims priority, application France, Mar. 26, 1985, 8504620
Int. Cl.⁴ H02H *1/01;* H01H *47/28*
U.S. Cl. 361—114 **8 Claims**



1. A multipole breaking device with electric remote control, comprising:

a breaking device per pole equipped with a bistable mobile main contact moveable between a closed and an opened position,

a trip release for moving the mobile main contact to the opened position in the event of a fault occurring,

a first mechanism for automatically tripping said trip release,

a first manual device for resetting the first mechanism,

a second mechanism, mechanically linked with the mobile main contact of each pole, for manually opening and closing the mobile main contact,

a remote control unit comprising an electromagnetic actuator, including an electromagnet, associated with the second mechanism,

a second manual device, coupled to the second mechanism to enable manual opening and closing of said mobile main contact,

an electronic circuit, including a static switch connected in a

power supply circuit of the electromagnet, for controlling excitation of the electromagnet in such a way as to bring about in the set position of the first mechanism a status change of the bistable mobile contact on each control pulse applied to the static switch,

a mobile main contact position detector,

a selector having an active and an inactive status for switching the position detector into or out of the electronic circuit,

a first input terminal assigned to a first electrical pulse control of the electronic circuit,

a second input terminal associated with a second mixed control of said electronic circuit, said second control being designed for a logic control by a hold signal when said position detector is in the electronic circuit, and for a second pulse control, independent of said first pulse control, when said position detector is out of the electronic circuit.

4,714,977

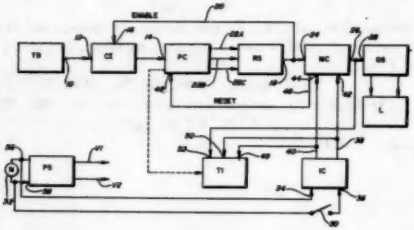
ELECTRONIC DELAY TIMER

John S. Hoelzer, Wauwatosa; Richard J. Graefe, Milwaukee, and James T. Libert, Waukesha, all of Wis., assignors to Square D Company, Palatine, Ill.

Continuation of Ser. No. 702,444, Feb. 19, 1985, abandoned, which is a continuation of Ser. No. 363,326, Mar. 29, 1982, abandoned. This application Jun. 5, 1987, Ser. No. 59,248

Int. Cl.[4] H01H *47/32*

U.S. Cl. 361—196 **12 Claims**



1. A machine tool timing relay having immunity from electrical noise on a control signal comprising:

an oscillator capable of generating pulses having a predetermined frequency;

means for adjusting said predetermined frequency over a continuous range of frequencies;

a counter capable of counting said pulses and capable of generating an output signal after a predetermined number of said pulses are counted;

means responsive to a start signal for initiating said counter to count said pulses;

an optical isolator circuit, responsive to said control signal for generating a light, detecting said light, and generating said start signal in response to said detecting said light in order to isolate said counter from electrical noise mixed with said control signal;

an electrical contact; and

an output circuit responsive to said output signal for operating said electrical contact when said counter generates said output signal so that said contact is operated after said counter counts a predetermined number of said pulses, thereby providing control over said contact after an interval of time required for said oscillator to generate said predetermined number of said pulses, and said means for adjusting said frequency providing continuous adjustment of said interval of time.

4,714,978

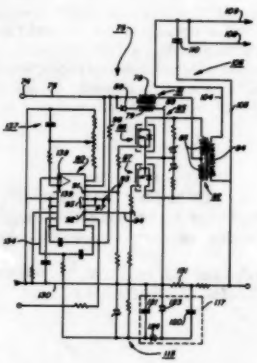
POWER SUPPLY FOR A.C. COROTRONS

James A. Coleman, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 17, 1986, Ser. No. 853,251

Int. Cl.[4] E03G *15/00*

U.S. Cl. 361—235 **6 Claims**



1. An a.c. power supply circuit for a corona discharge device of a xerographic type copying or printing machine, comprising:

(a) a pulse width modulator providing alternating drive signals of adjustable pulse width at a predetermined fixed frequency;

(b) an output transformer having primary and secondary windings;

(c) push-pull amplifier means for applying power to said transformer primary winding in response to said drive signals to operate said transformer whereby said transformer secondary winding generates an a.c. power output;

(d) an output line coupling said transformer secondary winding with said corona device;

(e) sensing means for sensing current in said corona device and providing a control signal representative thereof to said modulator,

said modulator adjusting the pulse width of said drive signals in response to said control signal to thereby adjust the a.c. power output of said transformer and maintain current in said corona device substantially constant, and

(f) filter means for filtering said transformer a.c. power output so as to provide a substantially uniform sinusoidal a.c. power output to said corona device,

said filter means including said transformer.

4,714,979

PROTECTED POTTED METALLIZED FILM CAPACITOR

George I. Duncan, Glenview, and Stephen L. Phelps, Chicago, both of Ill., assignors to Advance Transformer Company, Chicago, Ill.

Filed Dec. 16, 1986, Ser. No. 943,478

Int. Cl.[4] H01G *4/40*

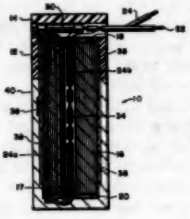
U.S. Cl. 361—274 **8 Claims**

3. An AC capacitor having a protective fault interruptor system for its capacitor section, wherein said capacitor is a dry metallized film high intensity discharge ballast type capacitor, wherein said capacitor includes a metallized film capacitor section, shooped edges serving as contact points for each plate of said capacitor, wherein said contact points are spaced apart from one another, said capacitor being connectable to a circuit through electrical leads from said contact points, a case, potting material securing said capacitor section and a portion of said leads within said case, and said leads extending through a

side wall of said case, wherein the protective fault interruptor system for said capacitor section comprising:

a fuse;

a thermal protector;



said fuse and said thermal protector connected in series with said capacitor section through at least one of said leads; and

said fuse, said thermal protector, said capacitor section and the connections to said at least one connecting lead all positioned within said case.

4,714,980

MEMORY CARD

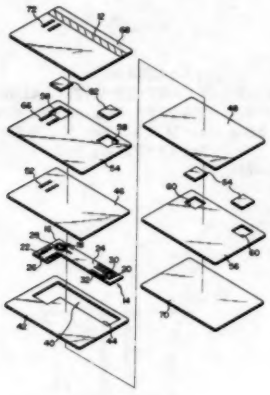
Kazuya Hara, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Sep. 19, 1986, Ser. No. 909,516

Claims priority, application Japan, Sep. 24, 1985, 60-210815

Int. Cl.[4] H05K *1/14*

U.S. Cl. 361—395 **9 Claims**



1. A memory card comprising:

a center sheet having a cavity;

an IC module located in said cavity of said center sheet and including a circuit board on which an IC chip and a plurality of external connecting terminals are mounted;

a first laminated structure formed of a plurality of sheets, each of which has substantially the same plane size as that of said center sheet and laminated to each other, and having a plurality of holes for exposing said external connecting terminals of said IC module to the outside, said first laminated structure being bonded to one side surface of said center sheet;

a second laminated structure formed of a plurality of sheets, each of which has substantially the same plane size as that of said center sheet and laminated to each other, said second laminated structure being bonded to the other side surface of said center sheet, the sheets of said second laminated structure being the same in number as the sheets of said first laminated structure, at least one of said first and second laminated structures having an opening at a position corresponding to said IC chip of said IC module located in said cavity of said center sheet, the area of said opening being a little larger than that of asid IC chip; and

a metal member located in said opening.

4,714,981

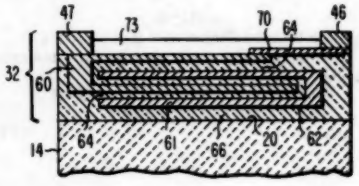
COVER FOR A SEMICONDUCTOR PACKAGE

Robert B. Gordon, Springfield Township, Delaware County, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 9, 1986, Ser. No. 849,901

Int. Cl.[4] H05K *5/03*

U.S. Cl. 361—400 **8 Claims**



1. A cover covering a semiconductor package, said semiconductor package including a plurality of leads adapted for making electrical contact with an electrical circuit external to said semiconductor package, said cover comprising,

(a) a body having a major surface which is substantially planar and an attaching surface opposite said planar surface for attaching said body to said semiconductor package;

(b) a composite layer containing a passive circuit and including at least one electrical contact, said composite layer disposed on said major surface; and

(c) a terminal attached to said electrical contact not in direct or indirect electrical contact through said semiconductor package with said semiconductor package including said leads and adapted for making electrical contact to said electrical circuit external to said semiconductor package independently of said leads.

4,714,982

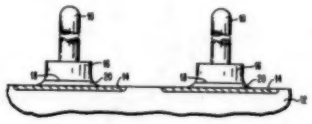
SUBSTRATE FOR A SEMICONDUCTOR PACKAGE HAVING IMPROVED I/O PIN BONDING

Chandrika Prasad, Poughkeepsie, and Andrew F. Szewczyk, Troy, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 626,185, Jun. 29, 1984, Pat. No. 4,634,041. This application Mar. 24, 1986, Ser. No. 843,472

Int. Cl.[4] H01L *23/48*

U.S. Cl. 361—404 **5 Claims**



1. In a substrate for an integrated circuit semiconductor package having at least one integrated circuit semiconductor device mounted on the top surface, and I/O pins mounted on the bottom surface electrically connected to the device through internal metallurgy in the substrate; the improvement comprising;

solder wettable pin pads on the bottom surface of said substrate, each having a predetermined area,

I/O pins bonded to said pin pads, each pin having a bonding surface with an area significantly less than the area of each of said pin pads, said I/O pins located on said pin pads whereby the periphery of each of said pin pads is spaced from the periphery of each of said respective bonding surfaces,

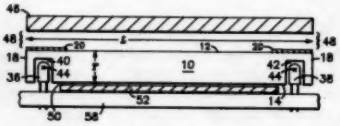
a brazing material of an alloy that at least includes Ag, and a metal selected from the group consisting of In and Sn and mixtures thereof disposed only between the bonding surfaces of each of said pins and each of the central areas of each of said pin pads thereby bonding the pins to the substrate but leaving peripheral pad areas devoid of brazing alloy.

4,714,983

UNIFORM EMISSION BACKLIGHT

Warren R. Lang, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 10, 1985, Ser. No. 743,226
Int. Cl.[4] F21V *13/04*
U.S. Cl. 362—27 **17 Claims**



1. An apparatus for providing a source of light emitted throughout a predetermined area, said apparatus comprising:

a first lamp having a light source therein;

a transparent member exhibiting a critical angle (θ_c with respect to air and having a polished top surface relative to an opposing frosted bottom surface, the bottom surface having a boundary substantially with air, said member having a first cavity therein located proximate a first end of said member, said first lamp being inserted into said first cavity so that said first lamp light source resides inside said member at a distance D_1 from the top surface; and

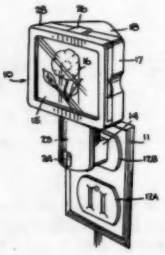
a first opaque section located on said member top surface opposing said member first cavity so that said first opaque section extends toward the central area of said member top surface for a distance greater than $D_1 X TAN (\theta_c$ from a point opposing the light source.

4,714,984

NIGHT LIGHT ASSEMBLY

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed Sep. 3, 1986, Ser. No. 903,153
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—101 **7 Claims**



1. A night light assembly which plugs into and is supported by an electrical wall outlet whose existing orientation is either horizontal or vertical, said assembly comprising:

A. a reflector shell having a vent therein and an open front;

B. a low-wattage bulb housed in said shell and held in a socket mounted on a case attached to the underside of the shell, said case having a plug projecting therefrom provided with prongs which are insertable into said outlet to supply power to the bulb whereby the resultant light is directed toward the open front;

C. a frame secured to the open front of the shell adapted to accommodate a window cartridge; and

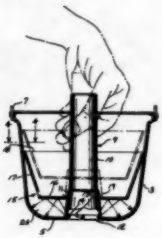
D. a removable window cartridge insertable in said frame, said cartridge being constituted by a transparent window which covers the open front of the shell, a pad of porous material placed behind the rear face of the plate and formed of a material permeable to said light, said pad being impregnated with a volatile aromatic liquid; and a sheet of translucent material adherable to the front face of the plate and having a picture thereon, said sheet being adhered to the plate so that the orientation of the picture is consistent with the existing orientation of the outlet, whereby when the bulb is powered, it back illuminates the picture which, in the absence of such illumination, is rendered visible by front ambient light illumination, the head from the powered bulb volatilizing the liquid to produce an aromatic vapor which is discharged through said vent.

4,714,985

TRICK-OR-TREAT CARRIER WITH FALSE BOTTOM

Charles P. Hickey, 1904-27 St., Monroe, Wis. 53566

Filed Mar. 26, 1987, Ser. No. 30,506
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—154 **9 Claims**



1. A carrier for use wherein a number of items are to be collected and carried in darkness, said carrier comprising, in combination:

(a) a unitary carryable bucket-like container (2) having an open top (4), a side wall (3) and a bottom wall (5),

(b) a light source (11) disposed within said container adjacent said bottom wall,

(c) and a false bottom member (15) removably disposed within said container and spaced from said bottom wall to form a light deflecting chamber (20),

(d) said false bottom member forming means to storingly receive collected items, and to carry said items out of said carrier when said false bottom member is removed from said container.

4,714,986
VEHICULAR REFLECTOR-LIGHT SOURCE COMBINATION UNIT

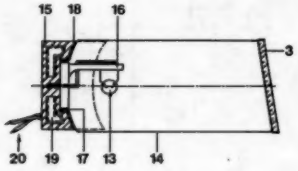
Ewald Wurster, Grünwald, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft fur elektrische Gluhlampen mbH, Munich, Fed. Rep. of Germany

Filed May 16, 1986, Ser. No. 863,962

Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519611

Int. Cl.[4] P21V *29/08*

U.S. Cl. 362—267 **19 Claims**



1. Vehicular reflector-light source and supply circuit combination unit having

a reflector (**2, 14**) having a reflecting surface and a back surface;

a high-pressure discharge lamp (**4, 13**) requiring high voltage starting pulses located within the reflector opposite the reflecting surface thereof; and

a supply circuit unit (**6, 19**) including a high voltage connection electrically connected to the high-pressure discharge lamp,

comprising, in accordance with the invention,

a unitary, sealed housing (**5, 15**) of insulating material immediately and directly located against the reflector at the back surface thereof, and and retaining said supply circuit within said housing,

the discharge lamp (**4, 13**) being secured and fitted to the supply circuit (**6, 19**) including said high voltage connection; and

adhesive sealing means (**11, 18**) continuously sealing and adhering contiguous surfaces between the reflector (**2, 14**) and the housing (**5, 15**) to retain said high voltage connection within a sealed system defined by the housing sealed and adhered to the reflector.

4,714,987
READILY ASSEMBLABLE LAMPSHADE, OR THE LIKE

Michael R. Dene, 60-Coverly Ave. N., Staten Island, N.Y. 10301

Filed Mar. 4, 1987, Ser. No. 21,691

Int. Cl.[4] F21V *1/06*

U.S. Cl. 362—352 **13 Claims**

1. A conically shaped device, comprising:

a tubular article comprised of a tube of a flexible pleated material, the article having an exterior, an interior, opposite axial ends and an upper end region adjacent one axial end thereof;

an outer shell comprising a downwardly depending, peripheral skirt having a first inner diameter, the skirt of the outer shell being disposed over at least a portion of the exterior at the upper end region of the article;

an inner shell having a second outer diameter, which is larger than the first diameter of the skirt, the inner shell being disposed inside the tubular article toward the upper end region of the tubular article, the inner shell engaging the interior of the tubular article at a location below where the outer shell engages the exterior of the tubular article; and

clamping means for drawing the outer and inner shells toward each other, and thereby for clamping the upper end region of the article between the shells, the shapes and

sizes of the outer and inner shells deforming the tubular article into a conical shape.

4,714,988
FEEDFORWARD FEEDBACK CONTROL HAVING PREDICTIVE DISTURBANCE COMPENSATION

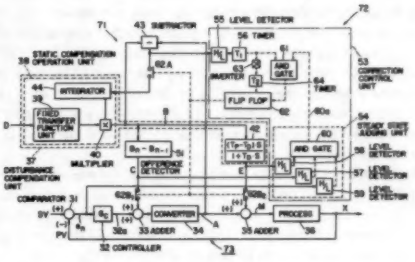
Kazuo Hiroi, Hachioji, and Kojiro Ito, Machida, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation-in-part of Ser. No. 477,384, Mar. 21, 1983, Pat. No. 4,563,735. This application Feb. 6, 1985, Ser. No. 698,791

Claims priority, application Japan, Mar. 26, 1982, 57-47349; Mar. 26, 1982, 57-47350; Aug. 25, 1982, 57-147155; Feb. 7, 1984, 59-19335

Int. Cl.[4] G05B *13/02*

U.S. Cl. 364—165 **20 Claims**



1. A process control system which adapts itself optimally to variations in disturbance, comprising:

feedback control means for outputting a feedback control signal thatis computed by comparing a set value and a process value;

feedforward control means for detecting a disturbance and for outputting a disturbance compensation signal to compensate for the disturbance based on a feedforward control model; and

gain adaptive means for comparing said disturbance compensation signal and a manipulated signal, which is a function of said feedback control signal and said disturbance compensation signal, and for correcting the gain of said feedforward control model so that the difference between the disturbance compensation signal and the manipulated signal is reduced.

4,714,989

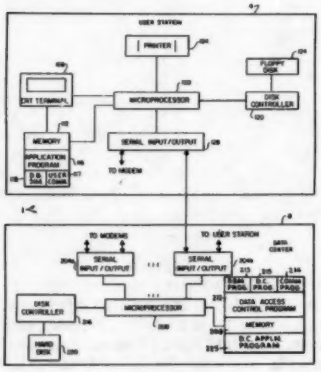
FUNTIONALLY STRUCTURED DISTRIBUTED DATA PROCESSING SYSTEM

Roger E. Billings, 3420 Pink Hill Cir., Blue Springs, Mo. 64015

Continuation of Ser. No. 826,721, Feb. 6, 1986, abandoned, which is a continuation of Ser. No. 350,159, Feb. 19, 1982, abandoned. This application Oct. 20, 1986, Ser. No. 921,219

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **14 Claims**



1. A method of operating a distributed data processing system including a plurality of independent, not necessarily uniform, general purpose user computers to run respective user application programs to process user data and a data center computer to store, retrieve, and update user data, said user computers being selectively interconnected with said data center computer by respective data communication hardware over data communication network means, said method comprising the steps of:

(a) managing in a data center computer by means of a data base manager program a user data base of user data items to perform data operations of storing, updating, and retrieving said user data items in response to data base calls for such operations from a user computer;

(b) running a user application program in a general purpose user computer to process user data, said user application program indirectly issuing data base calls for data operations regarding user data items in response to requirements for said data operations by said user application program;

(c) in response to a data base call regarding a user data item from a user application program, initiating by said user computer only a data communication link with said data center computer over data communication network means;

(d) communicating said data base call from said user computer to said data center computer;

(e) performing by said data center computer said data operation regarding said user data item defined by said data base call; and

(f) communicating an appropriate response to said data base call from said data center computer to said user computer.

4,714,990

DATA STORAGE APPARATUS

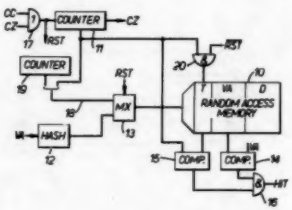
Peter L. L. Desyllas, Wilmslow, and Nicholas P. Holt, Hadfield, Via Hyde, both of United Kingdom, assignors to International Computers Limited, London, England

Filed Aug. 22, 1983, Ser. No. 525,152

Claims priority, application United Kingdom, Sep. 18, 1982, 8226663

Int. Cl.[4] G06F *12/12, 13/00*

U.S. Cl. 364—200 **6 Claims**



1. Data storage apparatus comprising:

(a) a cyclic counter,

(b) a data store having a plurality of individually addressable locations each of which is arranged to contain a data item and an associated tag, which tag is set to the value of the counter when the data item is written into the store,

(c) means for comparing the tag read out from a currently addressed location of the store with the current value of the counter and operative to generate a signal, indicating that the data item is valid, in response to the tag being equal to the current value in the counter,

(d) means for incrementing the value of the counter so as to render invalid all data items with a tag equal to a preceding value of the counter, and

(e) clearing means operative at n points in each cycle of the counter, where n is an integer greater than 1, to use the value in said counter to address and clear a different portion of the store at each of said n points, each said portion comprising 1/nth of the store, whereby, by the time the counter has been incremented through a complete cycle of values, every location in the store will have been cleared.

4,714,991

MICROPROGRAM CONTROL APPARATUS HAVING VARIABLE MAPPING BETWEEN MICROINSTRUCTION CONTROL BITS AND GENERATED CONTROL SIGNALS

John R. Eaton, Salford, England, assignor to International Computers Limited, London, England

Filed Feb. 1, 1985, Ser. No. 697,484

Claims priority, application United Kingdom, Feb. 21, 1984, 8404480

Int. Cl.[4] G06F *9/22*

U.S. Cl. 364—200 **9 Claims**

1. A microprogram control unit for producing control signals on a plurality of control signal lines, the unit comprising:

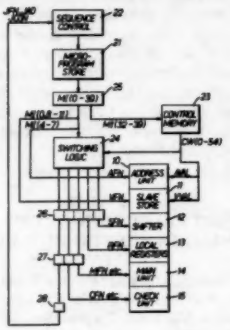
(a) a microprogram store for holding a plurality of microinstructions each comprising an address field and a plurality of control bits,

(b) a control word memory for holding a plurality of control words each of which specifies a particular set of correspondence between the control bits and the control signal lines,

(c) means for reading out a microinstruction from the microprogram store and utilizing the address field of that microinstruction to address the control word memory, thereby reading out one of the control words, and

(d) switching means responsive to the control word from the

control word memory, for connecting the control bits of the microinstruction read from the microprogram store to



selected control signal lines as specified by the control word.

4,714,992

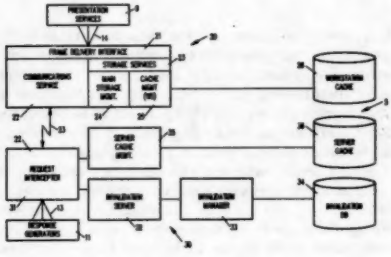
COMMUNICATION FOR VERSION MANAGEMENT IN A DISTRIBUTED INFORMATION SERVICE

Henry M. Gladney, Saratoga; Douglas J. Lorch, and Richard L. Mattson, both of San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1985, Ser. No. 801,897

Int. Cl.[4] G06F *1/00*

U.S. Cl. 364—200 **10 Claims**



1. A method for managing obsolescence of replicas of data objects, the objects being utilized in multiple nodes of a distributed processing system in which at least one node operates as an object source location having access to a source database containing source data objects and at least one other node operates as an object replica location having means for storing replicas of requested objects received from a source location, each source data object being alterable whereby replicas of altered objects stored at replica locations may become obsolete, comprising the steps of:

responsive to a request from a first replica location to ascertain obsolescence of data objects, extracting at the source location identifiers of a set of obsolete objects;

communicating said identifiers, if any, as an atomic demand-/response transaction to said first replica location;

rendering inaccessible at said first replica location any replicas corresponding to those identifiers received from the source location; and

removing from the source location those identifiers communicated to said first replica location.

4,714,993

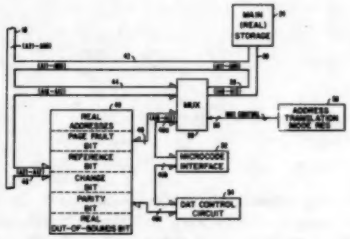
APPARATUS AND METHOD FOR EFFECTING DYNAMIC ADDRESS TRANSLATION IN A MICROPROCESSOR IMPLEMENTED DATA PROCESSING SYSTEM

David L. Livingston, Binghamton; Daniel J. Sucher, Vestal, and Bruce M. Walk, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 542,933, Oct. 18, 1983, abandoned. This application Sep. 26, 1986, Ser. No. 912,165

Int. Cl.[4] G06F *12/10*

U.S. Cl. 364—200 **9 Claims**



1. A dual purpose apparatus capable of operating in translation mode and segmentation mode for effecting virtual to real address translations using fixed page sizes in a microprocessor implemented data processing system having predetermined real storage and virtual storage while in said translation mode, and for effecting real storage segmentation while in said segmentation mode, comprising:

a microprocessor address bus;

table storage means connected to said address bus for storing a plurality of dual purpose pages, said storage means capable of storing the total number of pages possible in said predetermined virtual storage, each of said pages further comprising:

a translation information field; and

a real out-of-bounds bit;

accessing means, connected to said storage means, for accessing only said translation information field when said apparatus is in said translation mode and for accessing only said real out of bounds bit when said apparatus is in said segmentation mode.

4,714,994

INSTRUCTION PREFETCH BUFFER CONTROL

Vojin G. Oklobdzija, Putnam County, and Daniel T. Ling, Westchester County, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Apr. 30, 1985, Ser. No. 728,724

Int. Cl.[4] G06F *9/38*

U.S. Cl. 364—200 **8 Claims**

1. A method of controlling an instruction prefetch buffer that stores the code for a number of instructions that have already been executed as well as the code for a number of instructions yet to be executed, said method comprising the steps of:

storing an instruction fetch pointer which is supplied to said buffer as a write pointer that points to the location where a new word is to be written into the buffer;

writting instructions into said buffer at the locations pointed to by said instruction fetch pointer;

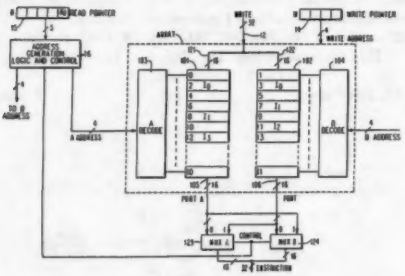
storing an instruction execution pointer which is supplied to said buffer as a read pointer that points to the location from which an instruction is to be read from the buffer;

reading instructions from locations in the buffer pointed to by said instruction execution pointer;

decoding each instruction read from the buffer to determine if it is a branch or jump instrustion;

determining if a target instruction of a branch or jump instruction is within a range of instructions which may be stored in the buffer;

determining for those target instructions found to be within said range if the target instruction is in the buffer; and



setting the instruction execution pointer to the location of the target instruction found to be in the buffer, said target instruction being either preceding or following a current instruction in the buffer.

4,714,995

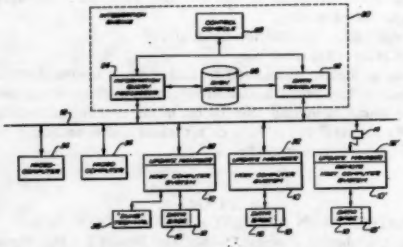
COMPUTER INTEGRATION SYSTEM

Anthony T. Materna; Roger A. Vossler, both of Santa Monica, and Frank M. Stepczyk, Manhattan Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Sep. 13, 1985, Ser. No. 775,927

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **11 Claims**



1. In a system for integrating a plurality of host computer systems having separate and local data bases having different organization and record formats with at least some items of data being included in more than one of the local data bases, said data items being designated "shared data items", and integrating system for ensuring that the values of the shared data items in the different local data bases are maintained consistent with each other, the integrating system comprising:

data translator means for translating data items received from any one of the local data bases for use in any other of the local data bases;

a communications network connecting the computer systems and the data translator means;

a plurality of update managers, each update manager being in communication with one of the host computer systems having a local data base, and each update manager including update capture means for transmitting to the data translator means over the communications network the values of any changes made by the update manager associated with the host computer to shared data in that computer's local data base, and update receiver means for receiving translated data base changes from the data translator over the communications network;

wherein the data translator means translates data base changes from the data base organizaiton and record format in which they are received into one or more other data base organizations and record formats, and transmits the translated changes over the communications network to each of the host computer local data bases, thereby ensuring consistency of the separate local data bases without imposing on any of them a particular data base organization or record format.

4,714,996

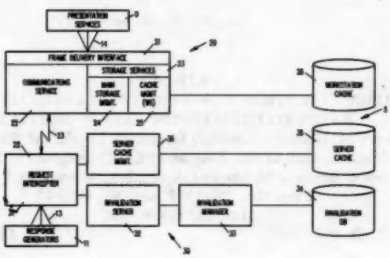
IMPACT CALCULATION FOR VERSION MANAGEMENT IN A DISTRIBUTED INFORMATION SERVICE

Henry M. Gladney, Saratoga; Douglas J. Lorch, and Richard L. Mattson, both of San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1985, Ser. No. 801,896

Int. Cl.[4] G06F *9/00*

U.S. Cl. 364—300 **16 Claims**



1. In a system for managing obsolescence of replicas of data objects, the objects being utilized in multiple nodes of a distributed processing system having at least one node operating as a source location having access to a source database containing data objects and at least one node operating as an object replica location having means for storing replicas of requested data objects received from a source location, each source data object being alterable whereby a change in a source data object will cause an impact to its replicas, a method for calculating the impact of a change to a source data object within the system, comprising the steps at the source location of:

(a) responsive to the change in the source data object, assigning a version number to the change and generating an identifier of a portion of the source database affected by the change;

(b) responsive to said identifier, generating a list of replicas including objects from the affected portion of the source database; and

(c) for a replica location in communication with the source location, recording a bad messages table of replicas in the list along with the version number assigned to the change for communication to the replica location.

4,714,997

DATA REDUCTION IN REPROJECTION SYSTEMS

Carl R. Crawford, and David A. Freundlich, both of Haifa, Israel, assignors to Elscint Incorporated, Boston, Mass.

Continuation of Ser. No. 500,347, Jun. 2, 1983, abandoned. This application May 6, 1986, Ser. No. 859,236

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—414 **7 Claims**

1. An arrangement for improving the processing time for systems that include reprojection means, said reprojection means reprojecting initial image data to obtain reprojections

for use in correcting for polychromatic artifacts in diagnostic medical images of a subject, said arrangement comprising:

(a) scanning means for directing radiation through said subject and detecting an intensity distribution of the radiation traversing the subject;

(b) means for providing a set of original projections derived from the detected intensity distribution;

(c) back-projector means for back-projecting said set of original projections to provide an original amount of initial image data for an initial image;

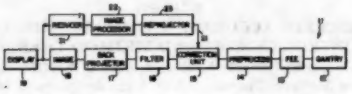
(d) image processor means for processing a reduced amount of said initial image data into initial image correcting data based on at least two or more constituent tissues having different energy dependent radiation attenuation characteristics;

(e) reprojector means for converting a reduced amount of said initial image correcting data into correcting reprojections;

(f) means separate from said reprojector means for reducing the original amount of initial image data supplied to said image processor means to speed up the correction operations of said image processor and said reprojector while maintaining the original amount of initial image data; and

(g) correction means for connecting said correcting reprojections to said back-projector means to provide image correcting data to correct said initial image data and to thereby provide corrected image data having reduced polychromatic artifact data but having an unreduced amount of image data equal to the amount in said initial image.

4. An arrangement for improving the processing time of systems that include reprojector means for generating reprojections used to reduce polychromatic artifacts in computerized tomographically (CT) produced images of a subject, said arrangement comprising:



(a) means for directing radiation through said subject;

(b) means for detecting a radiation intensity distribution of the radiation traversing the subject;

(c) means for providing a set of original projections derived from the detected radiation intensity distribution;

(d) means for selecting only certain projections of said set of original projections;

(e) back-projector means for back projecting said selected certain projections of said set of original projections to provide a correction image having reduced data;

(f) means for processing said correction image to provide correction data;

(g) means for reprojecting said correction data to provide correction reprojections;

(h) means for combining said correction reprojections and said projections to provide a set of corrected projections having substantially the same number of projections as said set of original projections; and

(i) means for connecting said set of corrected projections to said back projector means to provide a corrected image.

6. An arrangement for improving the processing time of systems that include reprojector means for generating reprojections used to reduce polychromatic artifacts in computerized tomographically (CT) produced images of a subject, said arrangement comprising:

(a) means for directing radiation through said subject;

(b) means for detecting a radiation intensity distribution of the radiation traversing the subject;

(c) means for providing a set of original projections derived from said detected radiation intensity distribution;

(d) back-projecting means for back projecting said set of original projections to form initial image data;

(e) image processor means including data compression means for providing compressed image correcting data;

(f) reprojector means for providing compressed image correcting reprojections;

(g) means for connecting said compressed image correcting reprojections to said back projector means to obtain compressed image correction data;

(h) means for expanding said compressed image correction data to provide image correction data; and

(i) means for combining said image correction data and said image data to provide a corrected image.

4,714,998

FUEL INJECTION SYSTEM MONITORING EQUIPMENT

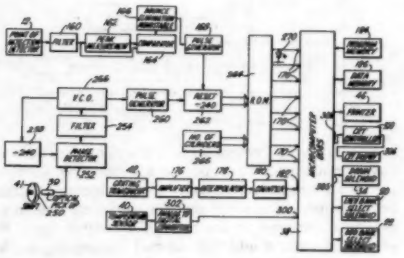
Stephen Bussey, Buckingham; Barry Cockburn, Gawcott, and Alastair E. F. Heath, Great Horwood, all of England, assignors to Leslie Hartridge Limited, Buckinghamshire, England

Filed Feb. 8, 1985, Ser. No. 700,443

Claims priority, application United Kingdom, Feb. 13, 1984, 8403749

Int. Cl.[4] G06F *3/14*; G01M *15/00*

U.S. Cl. 364—431.01 **7 Claims**



1. Fuel injection system monitoring equipment for metering the outputs from the different lines of a multi-line fuel injection system, comprising (a) a plurality of inputs to which respective lines of a multi-line fuel injection system are connectable, (b) a single commencement of injection detector for at least one of the lines positioned to detect the commencement of injection of that line and to issue a commencement of injection signal upon such detection, (c) a commencement of injection pulse generator connected to receive commencement of injection signals from the commencement of injection detector and to issue a commencement of injection pulse upon receipt of a signal from the commencement of injection detector, (d) a fuel injection pump running speed indicator which serves to pick up the rotational speed of the pump shaft and to issue indicator pulses at an output of the running speed indicator, at a rate which is proportional to that rotational speed, (e) a counter having an input connected to receive the said indicator pulses to provide a count of such pulses received by the counter, and a reset input connected to receive commencement of injection pulses from said commencement of injection pulse generator, so that the counter is reset when it receives a commencement of injection pulse, (f) an artificial commencement of injection pulse generator connected to said counter to generate an artificial commencement of injection pulse in dependence upon the count in the counter having a predetermined value representing a predetermined fraction of the time interval between two successive real commencement of injection pulses, whereby artificial commencement of injections pulses are generated for at least one line other than said one of the lines, (g) volumetric measure means connected to receive liquid from all the inputs and to produce metering signals indicative of the volume of liquid which passes into said measure means

from the different lines, and (h) volumetric measure indicator means connected to receive pulses from said artificial commencement of injection pulse generator and to receive signals from said volumetric measure means, to provide an indication of the volume of liquid received by said volumetric measure means between two successive pulses from said artificial commencement of injection pulse generator.

4,714,999

NUMERICAL CONTROL METHOD

Nobuyuki Kiya, Hachioji, and Motoaki Yoshino, Suginami, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

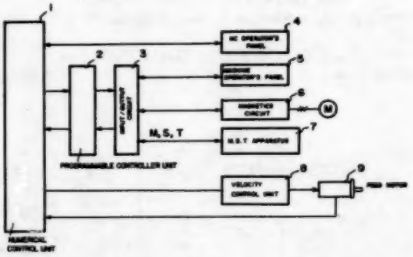
PCT No. PCT/JP85/00033, § 371 Date May 31, 1985, § 102(e) Date May 31, 1985, PCT Pub. No. WO85/03365, PCT Pub. Date Aug. 1, 1985

PCT Filed Jan. 26, 1985, Ser. No. 744,009

Claims priority, application Japan, Jan. 26, 1984, 59-012429

Int. Cl.[4] G06F *15/46;* G05B *19/18*

U.S. Cl. 364—474 **4 Claims**



1. A numerical control method in a numerical control system having a numerical control unit for executing numerical control of a machine on the basis of a machining program, and a programmable controller unit for executing sequence control of a machine tool on the basis of a control signal from said numerical control unit, the method comprising the following steps:

(a) returning the machining program to the beginning of the machining program when automatic operation of the numerical control unit is suspended;

(b) running the machining program up to a position necessary for resuming machining, step (b) being executed by the numerical control unit after step (a);

(c) operating the programmable controller unit based on data transmitted by the numerical control unit without the programmable controller unit outputting signals to the machining tool, step (c) being executed while step (b) is being executed; and

(d) resuming machining after the numerical control unit runs the machining program up to the position necessary for resuming machining.

4,715,000

DIGITAL PHASE-LOCKED LOOP AND FREQUENCY MEASURING DEVICE

William J. Premerlani, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 6, 1985, Ser. No. 762,992

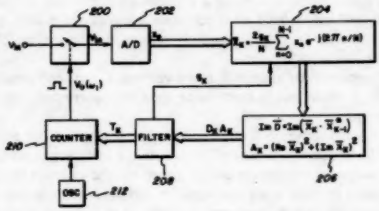
Int. Cl.[4] H03L *7/08;* G06F *15/31*

U.S. Cl. 364—484 **13 Claims**

1. A method for providing a sampling signal having a first frequency corresponding to a first period wherein said first frequency is maintained in substantially constant proportion to a second frequency of an input signal, said method comprising the steps of:

(a) sampling said input signal at instants determined by said sampling signal to provide first and second pluralities of data signals associated with respective first and second cycles of said input signal, wherein each said data signal represents the magnitude of said input signal at the sampling instant;

(b) performing a discrete Fourier analysis on each of said first and second plurality of data signals to provide first and second phasor signals, wherein each said first and second phasor signal is indicative of respective first and second voltage phasors associated with the fundamental frequency of the discrete Fourier transform of said first and second cycles, respectively;



(c) generating a difference signal representing the angular displacement between said first and second voltage phasors and, therefore, representing the difference between said first and second frequencies; and

(d) modulating said first period in response to said difference signal such that said difference signal is minimized and, therefore, said first frequency is maintained in substantially constant proportion to said second frequency.

4,715,001

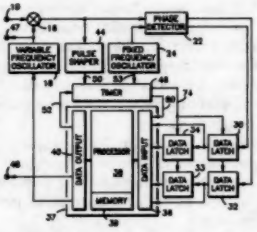
EXTREMELY ACCURATE AUTOMATIC FREQUENCY CONTROL CIRCUIT AND METHOD THEREFOR

Jake O. Deem; Ronald W. Kassik, both of Scottsdale, and N. Bruce Metteer, Phoenix, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 23, 1984, Ser. No. 643,507

Int. Cl.[4] H04B *1/26;* H03L *7/08;* G05B *15/02*

U.S. Cl. 364—484 **19 Claims**



1. An automatic frequency control circuit comprising:

a mixer having first and second inputs and an output, the first input of said mixer for receiving an input signal;

a variable frequency oscillator having a control input and an oscillation output, the oscillation output of said variable frequency oscillator being coupled to the second input of said mixer;

a phase detector having signal and reference inputs and having an output fir indicating the instantaneous phase difference between signals presented at the signal and reference inputs of said phase detector, the signal input of said phase detector being coupled to the ouput of said mixer;

a fixed frequency oscillator having an oscillation output coupled to the reference input of said phase detector; and

a computer having memory containing a predetermined program and having a data input and a data output, the

data input being coupled to the output of said phase detector, and the data output being coupled to the control input of said variable frequency oscillator.

12. A method for detecting the frequency of an input signal having an unknown frequency, said method comprising the steps of:

mixing the input signal with a variable frequency oscillating signal to produce an intermediate signal;

resolving a first instantaneous phase difference between the intermediate signal and a fixed frequency oscillating signal to produce a first phase value bearing a predetermined relationship to the phase difference;

resolving a second instantaneous phase difference between the intermediate signal and the fixed frequency oscillating signal to produce a second phase value, said second phase difference being resolved a controllable time interval after the revolution of the first phase difference;

computing an instantaneous frequency calculation based on the difference between the second and first phase values and on the time interval;

varying the frequency of the variable frequency oscillating signal in accordance with the instantaneous frequency calculation so that the variable frequency oscillating signal operates as negative feedback in said mixing step and tends to cause the instantaneous frequency calculation of said computing step to seek a DC level; and

repeating said resolving steps and said computing and varying steps until the instantaneous frequency calculation of said computing step is within a lock tolerance.

4,715,002

SYSTEM FOR RECORDING A VARIABLE VALUE, NOTABLY IN A WELL, AND FOR COMPRESSING STORED MEASUREMENT INTERVAL DATA

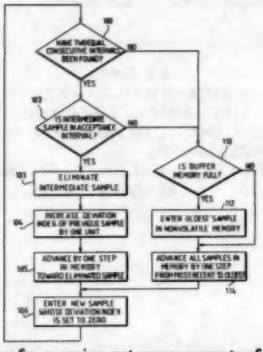
Patrick Vernon, Montrouge, and Jean-Claude Ostiz, Héricy, both of France, assignors to Schlumberger Technology Corporation, Houston, Tex.

Continuation of Ser. No. 419,250, Sep. 17, 1982, abandoned. This application Oct. 27, 1986, Ser. No. 922,809

Claims priority, application France, Nov. 4, 1981, 81 20685

Int. Cl.[4] G06F *15/20*; E21B *47/06, 47/00*

U.S. Cl. 364—422 **15 Claims**


100
HAVE THREE(3) CONSECUTIVE INTERVALS BEEN FOUND?
102
IS INTERMEDIATE SAMPLE IN ACCEPTABLE INTERVAL?
YES
110
IS BUFFER MEMORY FULL?
YES
112
ELIMINATE INTERMEDIATE SAMPLE
INCREASE DEVIATION INDEX OF PREVIOUS SAMPLE BY ONE UNIT
ENTER OLDEST SAMPLE IN NONVOLATILE MEMORY
ADVANCE BY ONE STEP IN MEMORY TOWARD ELIMINATED SAMPLE
ADVANCE ALL SAMPLES IN MEMORY BY ONE STEP FROM MOST RECENT TO OLDEST
114
ENTER NEW SAMPLE WHOSE DEVIATION INDEX IS SET TO ZERO

1. Apparatus for carrying out measurements of the variations of a value in a well as a function of a parameter, by means of a sonde lowered into this well and equipped with at least one transducer sensitive to said value, comprising:

means for acquiring successive samples representative of said value at equal predetermined intervals as a function of the evolution of said parameter;

means capable of selecting, from among the consecutive samples at the output of said acquisition means, samples between which the rate of change of said value has undergone a variation greater than a given threshold;

means for determining a variation interval denoting the time separation of said selected successive samples; and

means for recording data corresponding to said selected samples and respective deviation indices derived from said variation intervals in order to compress the recorded data, wherein each of said variation intervals is expressed as a power of two times an elementary interval, where n is the deviation index.

3. A method for recording measurements of a physical value characteristic of the condition of an underground reservoir, obtained by means of a sonde lowered into a well, the sonde containing at least one transducer sensitive to this value, a computer device including a buffer memory of the first-in first-out type and a nonvolatile memory unit, and a timing device operated in accordance with the evolution of a parameter in relation to which it is sought to record the variation in said value, to produce interval signals at constant elementary intervals of this parameter; comprising the steps of:

producing signals indicative of said value by means of said transducer;

forming digital samples of said value from said signals of the transducer in correspondence with each of said interval signals;

entering each of said digital samples in the buffer memory in its order of acquisition;

entering into the buffer memory, in correspondence with each sample entered, a deviation index which is an integer n initially set to zero for a newly entered sample, said index being characteristic of the variation interval of the parameter separating a sample entered in the buffer memory from the following sample in the order of entry into this buffer memory;

and after each entry of a sample:

(a) scanning the buffer memory in search of two equal consecutive deviation indices, these two indices corresponding to a first, a second and a third adjacent sample in the order of their entry into said buffer memory;

(b) if the search of step a) is unsuccessful, and if the memory is full,

making a recording in said nonvolatile memory of a digital information item corresponding to the oldest sample acquired in the buffer memory,

after which a new sample can be entered in said buffer memory;

(c) if the search of step a) shows such a set of a first, a second and a third sample,

making a check, by means of the computer, to determine whether these samples satisfy a predetermined relation denoting that the rate of change of said value between the first and the third sample has undergone a variation smaller than a predetermined threshold;

(d) if the relation of step (c) is satisfied,

eliminating the second sample from said buffer memory and incrementing the deviation index n of the first sample by one unit, such incrementation reflecting the increase by a factor 2 of the interval between said first sample and the following sample,

after which a new sample can be entered in the buffer memory;

(e) if this relation of step (c) is not satisfied and if the buffer memory is full,

entering information corresponding to the oldest sample in the buffer memory into the nonvolatile memory,

after which a new sample can be entered in the buffer memory.

4,715,003

METHOD FOR TEMPERATURE COMPENSATION AND MEASURING CIRCUIT THEREFOR

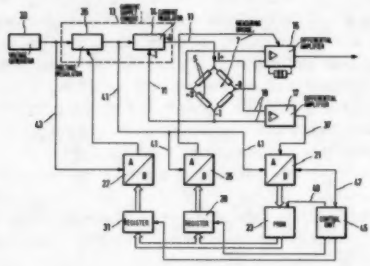
Hans W. Keller, and Michael Von Ritter, both of Winterthur, Switzerland, assignors to Keller AG fur Druckmesstechnik, Switzerland

Filed Jul. 23, 1985, Ser. No. 758,068

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1984, 3427743

Int. Cl.[4] G06F *15/20*

U.S. Cl. 364—571 **27 Claims**



1. A method for compensation of an analog, temperature dependent differential output signal of a pressure measuring circuit in a piezoresistive pressure transducer, said measuring circuit including a measurement bridge disposed on a pressure measurement cell, wherein an analog difference/output signal of said measurement bridge is provided to an output differential amplifier for generating said differential output signal, said method including the steps of:

(a) storing a plurality of fixed compensation values in a digital memory means;

(b) converting a temperature dependent analog voltage difference/input signal of said measurement bridge to a digital difference signal;

(c) providing said digital difference signal to said memory means and generating, as the output of said memory means and as a function of the magnitude of said digital difference signal, at least one digital compensation signal, each digital compensation signal corresponding to one of said stored compensation values;

(d) converting each digital compensation signal into a corresponding analog compensation signal; and

(e) providing each analog compensation signal to said pressure measuring circuit for compensation of said differential output signal, thus to generate a temperature compensated pressure measurement signal.

4,715,004

PATTERN RECOGNITION SYSTEM

Satoshi Kabasawa, Osaka, Japan; Ming-Shiun Hsieh; Shih-Ming Chang, both of Taipei, Taiwan, and Chun-Hong Lin, Tainan, Taiwan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 18, 1984, Ser. No. 611,734

Claims priority, application Japan, May 23, 1983, 58-91122

Int. Cl.[4] G10L *5/00*

U.S. Cl. 364—513.5 **5 Claims**

1. A pattern recognition system comprising:

pattern-extracting means for converting an input signal into a time sequence A_i (i=1, 2, . . . , I) of characteristic patterns;

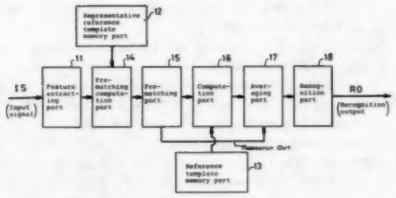
representative reference template memory means for storing representative reference templates B^m (m=1, 2, . . . , M) from among a plurality of reference templates B^m, said representative reference templates having smallest distances among said reference templates to the others of said reference templates;

reference template memory means for storing reference templates B_n^m (n=1, 2, . . . , N) which are other than said representative reference templates B^m (m=1, 2, . . . , M) and have same feature parameters as said representative reference templates;

pre-matching computation means for computing a matching between said time sequence A_i (i=1, 2, . . . , I) of characteristic patterns and said representative reference templates B^m;

pre-matching means for outputting a number j of smallest pre-matched distances, which are given by said pre-matching computation means, together with j corresponding category codes, where j is greater than 2;

computing means for computing a matching between said time sequence A_i (i=1, 2, . . . , I) of characteristic patterns and only those of said reference templates which correspond to said category codes issued from said pre-matching means among said reference templates stored in said reference template memory means;



averaging means for producing an average of a smallest k distance(s) for each group of:

(a) distances between said time sequence $/A_i$ (i=1, 2, . . . , I) and said reference templates B_n^m (n=1, 2, . . . , N), and

(b) a distance between said time sequence A_i (i=1, 2, . . . , I) and said representative reference template B^m obtained by said pre-matching computation means, for each of said j category codes obtained from said prematching means; and

recognition means for recognizing a category code corresponding to a group which includes a representative reference template B^m and reference templates B_n^m (n=1, 2, . . . , N) that are nearest to said time sequence A_i (i=1, 2, . . . , I).

4,715,005

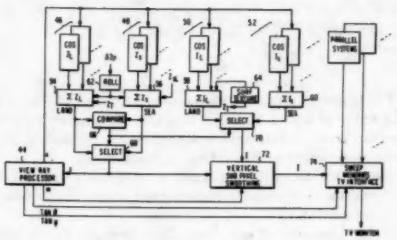
TERRAIN/SEASCAPE IMAGE GENERATOR WITH MATH MODEL DATA BASE

Robert A. Heartz, DeLand, Fla., assignor to General Electric Company, Philadelphia, Pa.

Filed Aug. 8, 1984, Ser. No. 638,706

Int. Cl.[4] G09B *9/08*

U.S. Cl. 364—521 **23 Claims**



1. A method of real-time computer generation of visual scenes comprising the steps of:

generating math models of land and sea elevation posts for the visual scene to be generated;

defining a horizontal field of view as a predetermined number of increments between sweeps perpendicular to a boresight from a view point;

defining a vertical field of view as a predetermined number of increments between view rays perpendicular to a boresight from a view point;

incrementing a predetermined change in range along the boresight from the view point and for each range increment, stepping a view ray down by an increment corresponding to an incremental change in the tangent of the view angle;

accumulating an elevation value of the view ray for each incremental change in the tangent of the view angle;

for each range increment, comparing the math model for land elevation posts with the math model for sea elevation posts and selecting the larger of the two;

comparing at each range increment the accumulated elevation value of the view ray with the selected math model of elevation posts; and

if a view ray strikes the selected elevation post, reading the data for that post to a display means, otherwise incrementing said math models of land and sea elevation posts.

4,715,006

IMAGE FORMING APPARATUS

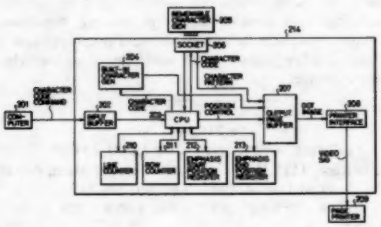
Satoshi Nagata, Tama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 654,106, Sep. 25, 1984, abandoned. This application Mar. 23, 1987, Ser. No. 30,292

Claims priority, application Japan, Sep. 30, 1983, 58-180670; Jan. 31, 1984, 59-14297

Int. Cl.[4] B41B *25/08*

U.S. Cl. 364—523 **18 Claims**



1. An image forming apparatus comprising:

first pattern generating means for generating a first pattern signal corresponding to input information;

second pattern generating means for generating a second pattern signal corresponding to input information, said second pattern generating means being removable with respect to the apparatus and storing specific data representative of particular characteristics of the second pattern signal;

discriminating means for determining whether or not said second pattern generating means is mounted on the apparatus; and

output means for outputting image data corresponding to the first pattern signal from said first pattern generating means and/or the second pattern signal from said second pattern generating means, said output means operating in accordance with said discriminsting means and including modified image data output means for outputting modified image data corresponding to the input information by utilizing a pattern signal which can be generated by the apparatus even if the pattern signal corresponding to the input information is not present in the apparatus.

4,715,007

INSTRUMENT FOR MEASURING FILM THICKNESS

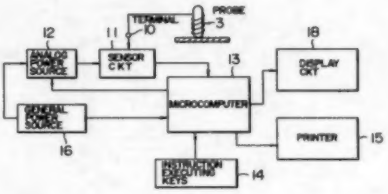
Toshio Fujita, Yokohama, and Kouzi Hasegawa, Kamifukuoka, both of Japan, assignors to Kett Electric Laboratory, Tokyo, Japan

Filed Feb. 5, 1985, Ser. No. 698,471

Claims priority, application Japan, Jul. 31, 1984, 59-159294

Int. Cl.[4] G01B *7/10*

U.S. Cl. 364—563 **3 Claims**



3. An electromagnetic measuring instrument having a main body for measuring a thickness of a surface processing film on a metal, said instrument comprising:

(a) a plurality of instruction executing keys provided on a front surface of said main body;

(b) a recording apparatus and an indicator enclosed in said main body;

(c) a terminal located on said main body for connecting a probe wound by a coil, said probe generating an electromagnetic field in said metal and detecting an electrical signal corresponding to said film thickness in accordance with a distance to said metal when said probe is pressed onto said film coated on the metal;

(d) a converting circuit for converting said electrical signal obtained from said probe to a digital value indicative of the film thickness;

(e) an operating circuit for performing processing on said digital value in accordance with instructions inputted from said instruction executing keys, and

(f) a holding circuit for holding the digital value, the digital value corresponding to the minimum value of the distances between the probe and the metal;

wherein an average of said film thicknesses and its standard deviation are calculated and, together with a number of measurements of the film thickness, outputted to said recording apparatus and to said indicator in response to pressing operations of said probe for a predetermined number of measurement times, said predetermined number of measurement times being preliminarily inputted from said instruction executing keys.

4,715,008

HAND-HELD DIGITAL THICKNESS GAGE

Robert L. Jones, La Habra, Calif., assignor to NDT Instruments, Inc., Huntington Beach, Calif.

Filed Dec. 17, 1982, Ser. No. 450,845

Int. Cl.[4] G01B *17/02*

U.S. Cl. 364—563 **21 Claims**

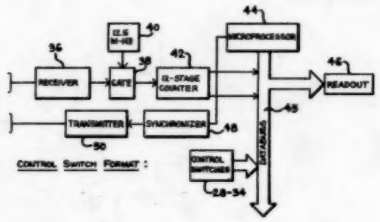
1. An improved ultrasonic thickness gage of the type having a transmitter for transmitting an ultrasonic pulse through a transducer into a specimen under test, a receiver for receiving the echo pulse through a transducer from said specimen, a high frequency oscillator and digital counter, the counter accumulating pulse generated by the oscillator during the time period between transmitting and receiving the ultrasonic pulses and generating a count signal indicative of such time period, a device for storing a signal which represents the velocity of sound in a test specimen of the material and for calculating the thickness of the specimen by multiplying the time period signal by the velocity signal, and a display for displaying a visual indication of the calculated thickness; the improvement

wherein said storing and calculating device comprises a microprocessor, and wherein said gage further comprises:

a keyboard having at least one key for selectively changing said velocity signal in a desired direction to register a new velocity signal, and

means in said microprocessor responsive to said velocity changing key for calculating said thickness based on said new velocity signal,

wherein said keyboard comprises at least one key connected to said microprocessor for selectively locking and unlocking said velocity signal whereby said key for selectively changing said velocity signal is rendered ineffectual and effectual depending on the status of said locking key.



4,715,009

DEVICE FOR DETERMINING ANGULAR POSITION OF A ROTATING PART

Heinz Böhmler, Pleidelsheim; Rolf Däumer, Weil der Stadt; Dieter Mayer, Wangen In Allgau, and Egbert Perenthaler, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

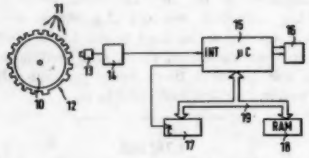
PCT No. PCT/DE85/00080, § 371 Date Nov. 12, 1985, § 102(e) Date Nov. 12, 1985, PCT Pub. No. WO86/00415, PCT Pub. Date Jan. 16, 1986

PCT Filed Mar. 13, 1985, Ser. No. 804,656

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1984, 3423664

Int. Cl.[4] G01P *3/42*

U.S. Cl. 364—565 **4 Claims**



1. Device for determining angular position of a rotating disk having on its circumference uniformly distributed angle markers and a reference marker differing from said angle markers, comprising a receiver unit for sensing spaces between corresponding points of successive angle markers and delivering output pulses at a cycle rate of the rotating disk, a continuously clocked counter coupled to said receiver unit to deliver in response to each output pulse a count of clock pulses; said clock rate exceeding a maximum cycle rate of said disk; storage means coupled to said counter to store four successive counts from said counter; and comparing means connected to said storage means to compare the stored four successive counts, said comparing means delivering three successive difference values whereby a reference marker is recognized when the intermediate difference value deviates by a predetermined magnitude from the remaining two difference values.

4,715,010

SCHEDULE ALARM DEVICE

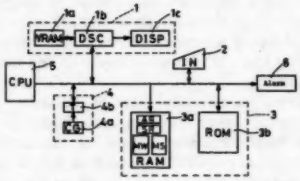
Tomohiro Inoue; Shinji Tsugei, and Shigeki Iguchi, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 13, 1985, Ser. No. 765,239

Claims priority, application Japan, Aug. 14, 1984, 59-169563

Int. Cl.[4] G06F *15/62, 3/02, 3/14*

U.S. Cl. 364—705 **2 Claims**



1. A schedule alarm device comprising:

input means for selectively inputting at least one of schedule data and memorandum data, both said data having preselected times associated therewith;

memory means responsive to said input means for storing said schedule data and said memorandum data;

timer means for determining time;

display means for displaying at least one of said schedule data and said memorandum data;

alarm means for producing an audible alarm upon display of at least one of schedule data and memorandum data; and

control means for controlling said display means such that said schedule data is displayed in response to the time determined by said timer means coinciding with said preselected time associated therewith and for controlling said display means such that said memorandum data is displayed in response to the time determined by said timer means coinciding with said preselected time associated therewith, said control means permitting simultaneous display of said schedule data and said memorandum data on said display means when said respective preselected times coincide.

4,715,011

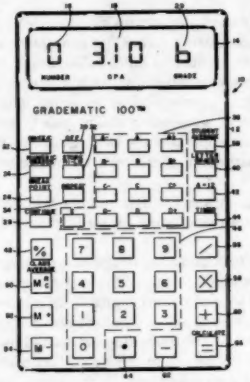
GRADE AVERAGING CALCULATOR

John L. Brittan, 1113 Brunn Ave., St. Joseph, Mich. 49085

Filed Dec. 4, 1984, Ser. No. 678,217

Int. Cl.[4] G06F *3/00, 7/00*; G09B *7/00*

U.S. Cl. 364—734 **30 Claims**



1. A calculator for use by teachers for converting numeric scores into student letter grades comprising:

means for inputting a high numeric standard and a low numeric standard;

means for calculating numeric ranges between said high and low numeric standards, each of said ranges corresponding to a letter grade;

means for inputting a student numeric score;

means for determining the numeric range encompassing the student numeric score and for determining the corresponding student letter grade; and

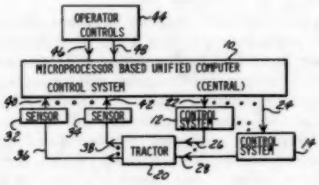
display means for displaying the corresponding student letter grade.

4,715,012

ELECTRONIC TRACTOR CONTROL

Otto Mueller, Jr., Detroit, Mich., assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Oct. 15, 1980, Ser. No. 191,240
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—900 **9 Claims**



1. A unified control system in combination with a tractor having a cab, an engine, and a plurality of controlled subsystems including a rear-mounted implement hitch; said unified control system including

a principal control unit having a principal microprocessor associated with the cab of said tractor

first and second subservient control units each having operating condition sensors and a subservient microprocessor, said first subservient control unit being associated with the engine of said tractor, and said second subservient control unit being associated with the rear-mounted implement hitch of said tractor, and each of said control units controlling at least one associated subsystem in response to sensed operating conditions;

communication link means connecting said control units to each other and capable of transmitting data descriptive of said sensed operating conditions from the subservient control units to said principal control unit;

data requesting means associated with one of said subservient control units for requesting from said principal control unit data descriptive of an operating condition of a subsystem associated with the other of said subservient control units; and

operating means associated with said one subservient control unit for generating control signals to an associated subsystem in response to said requested data.

4,715,013

COPROCESSOR INSTRUCTION FORMAT

Douglas B. MacGregor; John Zolnowsky, and David Mothersole, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 485,676, Apr. 18, 1983, abandoned. This application Jul. 25, 1986, Ser. No. 889,591
Int. Cl.[4] G06F *9/00*
U.S. Cl. 364—900 **2 Claims**

1. In a data processing system responsive to a single stream of instructions, wherein the data processing system comprises:

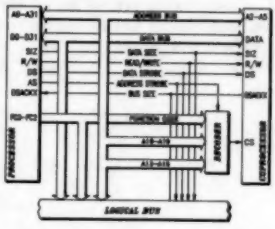
a general purpose processor adapted to independently decode and execute each of a first predetermined subset of said instructions; and

any of a plurality of special purpose coprocessors each adapted to cooperate with the processor in the independent decoding and execution of each of a respective second predetermined subset of said instruction;

the processor comprising:

first means for receiving each of said instructions comprising said stream of instructions;

second means for detecting in a predetermined operation bit field of each of said received instructions a predetermined bit value characteristic of each and every one of said instructions comprising said second subset of said instructions;



PROCESSOR – COPROCESSOR SYSTEM BLOCK DIAGRAM

third means for providing to said coprocessor from a predetermined command bit field of each of said detected instructions any of a plurality of predetermined command signal values each of which indicates a predetermined command which must be performed by said coprocessor in support of the execution of said detected instruction by the processor;

fourth means for receiving from said coprocessor a response to the receipt of said command, said response comprising any of a plurality of response signal values each of which indicates whether a predetermined task must be performed by said processor in support of the performance of said command by said coprocessor; and

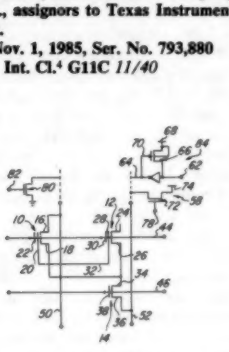
fifth means for performing said task if indicated by said received response signal value.

4,715,014

MODIFIED THREE TRANSISTOR EEPROM CELL

James A. Tuvell, Houston, and Michael C. Smayling, Missouri City, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 1, 1985, Ser. No. 793,880
Int. Cl.[4] G11C *11/40*
U.S. Cl. 365—185 **7 Claims**



1. An electrically erasable programmable semiconductor memory cell having an associated conducting column line, read/write line, sense line and row line, comprising:

a floating gate transistor having a control gate, a floating

gate and a source to drain path at a face of a semiconductor body, the source to drain path coupled at one end to said column line;

switch means connected between said read/write line and another end of the source to drain path of said floating gate transistor and having a gate coupled to said row line for controlling the opening and closing of said switch in response to a selection voltage signal on said row line; and

tunnel means coupled to the floating gate of said floating gate transistor, to said read/write line, to said sense line and to said switch means, said tunnel means responsive to predetermined voltages on said sense line,

read/write and row lines to selectively tunnel electrons to or from said floating gate and in response to cause the voltage potential on said floating gate to fall or rise and wherein for read cycles said column line is coupled to ground and said read/write line is precharged.

4,715,015

DYNAMIC SEMICONDUCTOR MEMORY WITH IMPROVED SENSE SIGNAL

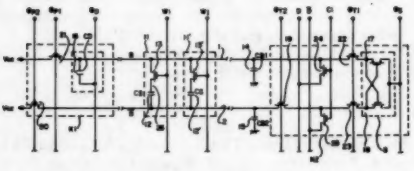
Toshio Mimoto, Nara, and Yoshiji Ota, Tenri, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 29, 1985, Ser. No. 738,870

Claims priority, application Japan, Jun. 1, 1984, 59-113742; Jun. 4, 1984, 59-116310; Jun. 4, 1984, 59-116311; Jun. 4, 1984, 59-116312; Jun. 4, 1984, 59-116313

Int. Cl.[4] G11C *11/24*

U.S. Cl. 365—210 **8 Claims**



1. A dynamic semiconductor memory comprising

memory cells, each including a first bit line and a second bit line for inputting and outputting information, said first and second bit lines being complementary to each other, a storage capacitor means for storing information and a selecting means for selecting said storage capacitor means, one end of said storage capacitor means being connected to said second bit line and the other end of said storage capacitor means being connected through said selecting means to said first bit line,

a sense amplifier means for amplifying a differential voltage outputted to said complementary first and second bit lines,

a control means adapted to connect said sense amplifier means and said second bit line only during a period when said differential voltage is inputted to said sense amplifier means and to disconnect said second bit line from said sense amplifier means during an active period of said sense amplifier means, and

a dummy storage capacitor with one end connected to said first bit line and the other end connected to a dummy control signal line.

4,715,016

MEMORY SAFEGUARD DEVICE FOR MICROPROCESSOR

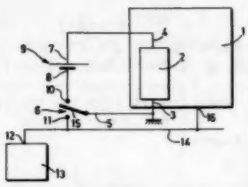
Sylves Lamiaux, Yerville, and Alex Kuhn, Pontoise, both of France, assignors to Societe d'Applications Generales d'Electricite et de Mecanique (SAGEM), Paris, France

Filed Oct. 7, 1985, Ser. No. 784,773

Claims priority, application France, Oct. 15, 1984, 8415759

Int. Cl.[4] G11C *11/40*

U.S. Cl. 365—229 **3 Claims**



1. A microprocessor memory safeguard device, comprising:

a safeguard battery having a pair of terminals; and

connection means for connecting said terminals to terminals of a microprocessor memory, said connection means comprising a switching means with (i) a first input terminal, (ii) a second input terminal and (iii) a common terminal adapted to be connected to (i) one of said terminals of said microprocessor memory and (ii) a logic zero input of said microprocessor, one of said first input terminal and said second input terminal of said switching means being connected to one of said terminals of said battery, the other of said terminals of said battery being adapted to be connected to another terminal of said microprocessor memory, the other of said first input terminal and said second input terminal of said switching means being adapted to be connected to an initialization line for initializing said microprocessor, and said common terminal being engageable with said other of said first input terminal and said second input terminal of said switching means to engage said switching means with said initialization line.

4,715,017

SEMICONDUCTOR MEMORY DEVICE WITH PLURAL LATCHES FOR READ OUT

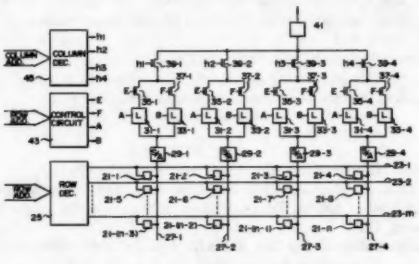
Hiroshi Iwahashi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 20, 1985, Ser. No. 703,435

Claims priority, application Japan, Feb. 21, 1984, 59-30692

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—239 **15 Claims**



1. A semiconductor memory device addressed by a row address signal and a column address signal and comprising:

memory cells, arranged in a matrix of rows and columns, for storing data;

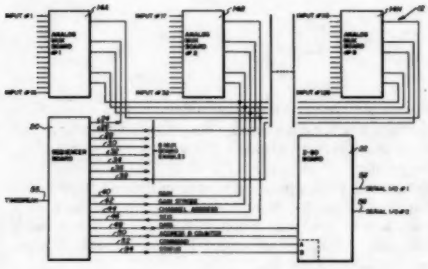
bit lines and word lines connected to said memory cells;
first latching means, connected to said bit lines, for latching data of said memory cells of arrow specified by the row address signal;
second latching means, being connected to said bit lines, for latching data of said memory cells of a row specified by the row address signal;
reading means for reading out data latched by said first latching means in response to the column address signal, and, after completion of reading of the data stored in the first latching means, for reading out data stored in the second latching means;
whereby said second latching means latches the stored data of the memory cells of the next row to be read out in response to the row address signal while said reading means is reading out the data stored in the first latching means.

4,715,018

OBC LOCATION SYSTEM

Ronald B. Blair, Lewisville, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 15, 1986, Ser. No. 819,076
Int. Cl.[4] G01V *1/38*
U.S. Cl. 367—19 **9 Claims**



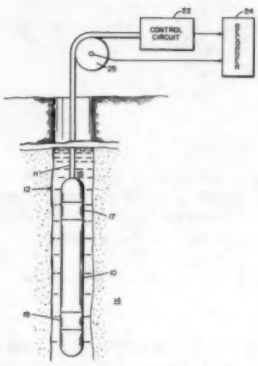
1. A data processing circuit for determining the location of an ocean bottom cable having at least one acoustic pulse detector which produces an electrical signal in response to remotely generated acoustic pulses fired at different locations comprising:
multiplexer circuit for receiving a plurality of analog differential seismic signal and providing a single analog time-multiplexed seismic signal comprised of a plurality of channels, each channel corresponding to one of said plural analog differential seismic signals;
sequencer circuit connected to said multiplexer circuit, said sequencer circuit receiving said time-multiplexed seismic signal from said multiplexer circuit; and
processor circuit connected to said sequencer circuit, said processor circuit processing data from said sequencer circuit to locate said at least one acoustic pulse detector of said ocean bottom cable;
wherein said sequencer circuit further comprises:
means for setting a threshold value for each of said channels of said time-multiplexed seismic signal;
means for sampling said channels of said time-multiplexed seismic signal;
means for comparing each of said sampled channels of said time-multiplexed seismic signal to its channel threshold value;
means for measuring time elapsed between time of start of sampling of each of said channels of said time-multiplexed seismic signal and time when each of said sampled channels of said time-multiplexed seismic signal exceeds its channel threshold value; and
means for transmitting said time measurements to said processor circuit.

4,715,019

BOREHOLE LOGGING METHOD FOR DETERMINING THE DAMPING OF ACOUSTIC TUBE WAVES IN SUBSURFACE FORMATIONS ALONG A BOREHOLE WALL

William L. Medlin, and Gary L. Zumwalt, both of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 27, 1986, Ser. No. 822,504
Int. Cl.[4] G01V *1/28*
U.S. Cl. 367—31 **3 Claims**



1. An acoustic well logging method for determining the damping of acoustic energy in a subsurface formation surrounding a borehole, comprising the steps of:
(a) traversing a borehole with a well logging tool containing an acoustic transmitter and at least one spaced-apart receiver,
(b) exciting said transmitter with a steady-state sine wave tone burst during an initial portion of a fixed time period to cause said transmitter to resonate and generate acoustic tube waves,
(c) removing the excitation of said transmitter during a terminal portion of said fixed time period, whereby amplitudes of said tube waves build-up to a steady-state value during said initial portion of said time period and decay from said value over a terminal portion of said time period,
(d) recording the amplitudes of said tube waves at said receiver during at least the terminal portion of said time period,
(e) determing an amplitude peak of each sine wave cycle of said tube waves,
(f) determining a logarithm of said amplitude peaks,
(g) generating a logarithmic plot of said amplitude peaks of said recorded tube waves,
(h) determining a slope of said logarithmic plot of tube wave amplitudes,
(i) determining a negative inverse of said slope of said logarithmic plot, and
(j) multiplying said negative inverse of the slope of said logarithmic plot by π (Pi) as a measure of damping of said tube waves in the subsurface formation along the borehole wall.

4,715,020

SIMULTANEOUS PERFORMANCE OF MULTIPLE SEISMIC VIBRATORY SURVEYS

Ralph A. Landrum, Jr., Houston, Tex., assignor to Western Atlas International, Inc., Del.

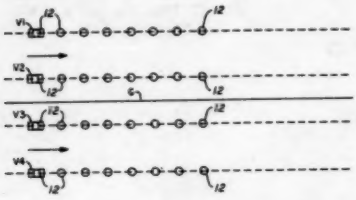
Filed Oct. 29, 1986, Ser. No. 925,810
Int. Cl.[4] G01V *1/00*
U.S. Cl. 367—38 **16 Claims**

1. A method of conducting n seismic surveys simultaneously

at substantially the same location where n is a whole number greater than two comprising:

simultaneously transmitting n times with n vibratory sources, n signals;

detecting the n signals resulting from the n simultaneous transmissions of the n signals;



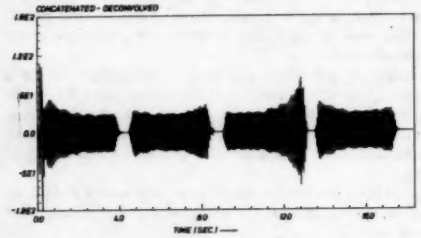
varying the initial phases of said transmitted signals among n initial phases to enable the signal transmitted by each of the n vibratory sources to be separated from the n detected signals by data processing.

4,715,021

METHOD FOR FILTERING AND COMBINING SEISMIC DATA HAVING DIFFERENT SPECTRAL CHARACTERISTICS

Karen K. Dittert, Houston, Tex., assignor to Exxon Production Research Co., Houston, Tex.

Filed Aug. 8, 1984, Ser. No. 638,814
Int. Cl.[4] G01V *1/28, 1/36*
U.S. Cl. 367—41 **7 Claims**



1. A method of filtering and combining seismic data having different spectral characteristics, including the steps of:

(a) transmitting a plurality of seismic signals into a subterranean earth formation, each of said signals having a characteristic frequency amplitude spectrum;

(b) generating a plurality of reference signals each of which is substantially identical to a different one of said plurality of seismic signals;

(c) recording a return portion of each of said seismic signals, after said seismic signal has propagated through the subterranean earth formation, to produce a plurality of seismic traces;

(d) generating a correlating signal for each reference signal trace such that the sum of the correlations of each of said correlating signals with its associated trace is an approximately minimum phase signal whose frequency amplitude spectrum is the sum of the frequency amplitude spectra of the individual reference signals;

(e) correlating each trace with its associated correlating signal; and

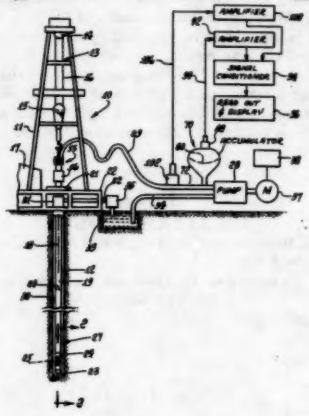
(f) stacking the correlated signals generated in step (e).

4,715,022

DETECTION MEANS FOR MUD PULSE TELEMETRY SYSTEM

David E. Yeo, Santa Ana, Calif., assignor to Scientific Drilling International, Houston, Tex.

Continuation of Ser. No. 771,462, Aug. 29, 1985, abandoned.
This application Jul. 14, 1986, Ser. No. 885,523
Int. Cl.[4] G01V *1/40*
U.S. Cl. 367—83 **13 Claims**



1. In apparatus transmitting signals from within a well bore to the surface, and for detecting such signals, there being a drill pipe string and rotary bit means in the well bore, the combination comprising

(a) first means for supplying a stream of drilling fluid to the drill pipe string for flow downwardly in the bore as a down stream, said first means including a flow line and a fluid pump connected with said line and operable to pressurize said drilling fluid,

(b) structure in the well bore and to which said drill string is connected for passing drilling fluid to the bit means, the fluid then flowing back up the well bore in a return stream,

(c) a first passage associated with said structure for diverting flow of some of the drilling fluid, and a valve associated with said structure and operable to interruptedly control flow of diverted fluid, via said passage, thereby to produce pulses in said down stream, the pulses traveling upwardly to fluid in said line, and characterized as providing acoustic particle velocity changes,

(d) an instrument associated with said valve, in the bore, for controlling said operation of the valve as a function of data to be transmitted to the surface,

(e) an accumulator connected with said line and defining a chamber into which said pulses are transmitted, the accumulator including a diaphragm in said chamber, one side of the diaphragm contacted by said fluid, and there being second fluid at the opposite side of the diaphragm and to which said pulses are transmitted via the diaphragm, the diaphragm movable to different positions in the chamber in response to operation of the pump,

(f) the pump producing pulsations in the drilling fluid in the line between the pump and the accumulator and at a first pulsation frequency f_1, the accumulator filtering said pulsations to reduce their amplitudes in the drilling fluid between the accumulator and the bit means, the valve operating to produce said pulses having a second frequency or frequencies substantially greater than f_1 in the drilling fluid between the valve and the accumulator,

(g) and a first pressure tranducer located to detect said pulses in the second fluid, irrespective of the position of the diaphragm in response to operation of the pump,

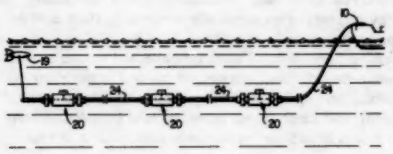
(h) the accumulator and transducer together providing a means for converting changes in acoustic particle velocity into pressure changes.

4,715,023

COAXIAL, DUAL CHAMBER SEISMIC AIR GUN

Bernard Otto, Arlington, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 18, 1987, Ser. No. 27,369
Int. Cl.[4] H04R 23/00
U.S. Cl. 367—144 17 Claims



1. A marine seismic source array for generating acoustical waves in water, said array comprising:

a seismic array bundle adapted to be towed by a vessel through a body of water; said bundle having a main, central air supply passage extending therethrough adapted to provide a passageway for compressed air under high pressure throughout said array;

a plurality of air guns, each air gun comprising:

an elongated housing having a central bore extending therethrough along the longitudinal axis of said housing;

a first chamber having an inlet and an outlet in said housing;

first valve means for opening and closing said outlet of said first chamber;

means in said housing for supplying air from said central bore in said housing to said inlet of said first chamber when said outlet is closed to thereby provide a charge of air under pressure in said first chamber; and

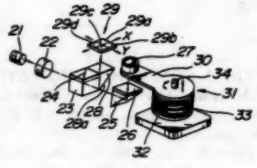
means for opening said first valve means to discharge said charge of air through said outlet of said first chamber; and means for connecting each of said housing of said plurality of air guns into said seismic array bundle at spaced intervals whereby said central bore in each of said housings is coaxial with said central air supply passage and forms an integral part thereof.

4,715,024

OPTICAL HEAD WITH PROVISION FOR TRACKING AND FOCUSSING CONTROL

Tohru Musha, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Continuation of Ser. No. 603,299, Apr. 24, 1984, Pat. No. 4,644,516. This application Nov. 19, 1986, Ser. No. 932,343
Claims priority, application Japan, Apr. 28, 1983, 58-73846
Int. Cl.[4] G11B 7/00
U.S. Cl. 369—44 3 Claims



1. An optical head for reproducing information recorded along at least one information track on a substantially planar optical record medium, comprising:

a base member including a portion which extends in a first direction parallel to a plane containing said at least one information track;

a light source arranged on said base member for emitting a light beam;

a reflecting member arranged on said base member for reflecting said light beam emitted from the light source in a second direction substantially perpendicular to said first direction as well as to said plane containing said at least one information track;

objective lens means arranged on said base member and being movable in said second direction for effecting a focussing control as well as in a third direction perpendicular to said second direction for effecting a tracking control, and having an optical axis parallel to said second direction for projecting said light beam reflected by said reflecting member onto the record medium as a fine spot, for collecting a light flux reflected by the record medium, and for directing the light flux toward said reflecting member;

electromagnetic driving means having a portion arranged on the base member adjacent to said reflecting member for moving said objective lens in said second and third directions in accordance with a focussing error and a tracking error, respectively;

a beam splitting member arranged on the base member for directing the light beam emitted from the light source to said reflecting member and for directing the light flux reflected by the reflecting member in a fourth direction; and

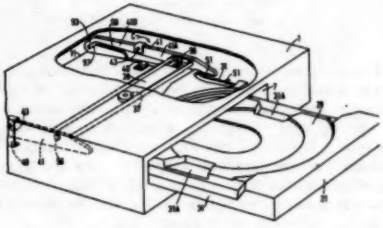
light detecting means arranged on the base member for receiving the light flux emanating from said beam splitting member and for deriving a signal representing information recorded on the record medium and signals representing said focussing error and tracking error, respectively.

4,715,025

DISC-RECORD PLAYER COMPRISING A DISC-LOADING MECHANISM

Antonius A. C. C. Eijsermans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 22, 1985, Ser. No. 768,399
Claims priority, application Netherlands, Mar. 4, 1985, 8500593
Int. Cl.[4] G11B 17/04, 1/00
U.S. Cl. 369—75.2 5 Claims



1. A disc record player comprising

a frame,

a housing having a front opening therein,

a turntable mounted for rotation in said frame

a drawer movable horizontally on a rectilinear path in inward and outward directions through said opening for transferring a disc respectively to and from said turntable,

a pressure member support spanning said turntable and carrying a pressure member above said turntable for urging said disc against said turntable, said support being movable vertically between an operative position and an

inoperative position remote therefrom, said support being movable along a pair of rectilinear guides in the frame on opposite sides of the turntable,

a pair of levers generally parallel to the direction of movement of said drawer on opposite sides thereof, each lever being pivotable about a spindle supported in said frame, each lever having a first lever arm extending from said spindle toward said front opening and a second lever arm extending from said spindle away from said front opening, each first lever arm cooperating with said pressure member support, each second lever arm carrying a first coupling means for cooperation with a respective second coupling means on the drawer, one of each pair of cooperating coupling means comprising a wall portion which is inclined viewed in the inward direction of movement of the drawer, a guide element of the other coupling means of each pair being moved over said wall portion during the inward movement of the drawer to cause the lever to be pivoted and the pressure member to be moved vertically into the operative position.

4,715,026

CIRCUIT ARRANGEMENT FOR A COMMUNICATIONS SYSTEM FOR THE TRANSMISSION OF MESSAGE INFORMATION FROM NARROWBAND AND BROADBAND TERMINAL EQUIPMENT WITHIN A LOCAL NETWORK CONSTRUCTED AS A LOOP

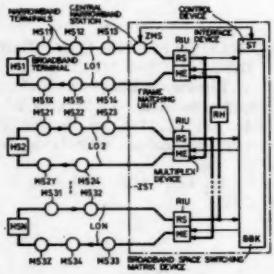
Joerg Eberspaecher, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 7, 1986, Ser. No. 860,580

Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3517006

Int. Cl.[4] H04J *15/00*

U.S. Cl. 370—1 **3 Claims**



1. In a circuit arrangement for a communications system for the transmission of serial bit message information, particularly multiplex data transmission in optical transmission systems comprising light waveguides, the circuit arrangement being of the type comprising a loop local network including broadband and narrow band terminals adapted to different types of data transmission with respect to quantity of data transmission and data transmission rate within a frame and the method of transmission, the improvement comprising:

a plurality of loop sub-networks in the loop local network, each of said loop sub-networks comprising at least one broadband terminal and a plurality of narrow band terminals serially connected via light wageguides and supplementing one another up to the maximum data quanity with respect to the maximum quantity of data to be transmitted in a frame within a predetermined time;

a centrally-controlled broadband space switching matrix device;

a plurality of sub-loop interface devices each including first and second transmitting outputs and first and second receiving inputs, said first transmitting output connected to said broadband space switching matrix device and to said first receiving input of an adjacent sub-loop interface device, said first receiving input connected to said broadband space switching matrix device, and said second transmitting output and said second receiving input connected to the light waveguides of the respective loop sub-networks and each of said interface devices acquiring the data of said broadband and narrow band terminals;

each of said sub-loop interface devices comprising a frame matching unit for augmenting transit time in the respective loop sub-network to a whole multiple of the frame duration, and a multiplex device for combining the data received from said broadband space switching matrix device and the adjacent sub-network to form a new, complete frame; and

a central narrow band station connected in one of said loop sub-networks and connected to and controlled by said broadband space switching matrix device to control call setup and clear down between said broadband terminals via said broadband space switching matrix device.

4,715,027

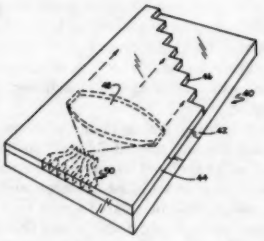
INTEGRATED OPTIC MULTI/DEMULTIPLEXER

Amaresh Mahapatra, Lexington, and Donald H. McMahon, Carlisle, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 29, 1986, Ser. No. 868,098

Int. Cl.[4] H04B *9/00*

U.S. Cl. 370—3 **13 Claims**



1. An integrated optic device comprising a thin, planar substrate made of a transparent dielectric material and having integrally formed therein, perpendicular to the major plane of said substrate, an echelon grating structured to receive electromagnetic radiation within a given bandwidth and diffract it into components of different wavelength angularly dispersed with respect to one another so that at a predetermined distance away from said echelon grating said components are spatially separated for individual coupling and subsequent use, said echelon comprising a plurality of steps whose physical dimensions are at least several times larger than the wavelength of radiation encompassed by said given bandwidth to provide said device with a high resolution for separating a plurality of communication channels closely spaced in wavelength and for facilitating the fabrication of said echelon grating in integrated optic format using either photolithography, ion milling, or r.f. plasma etching.

4,715,028

OPTICAL COMMUNICATION SYSTEM

Donald H. McMahon, Carlisle, and Gilbert L. Johnson, Jr., Marlborough, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 13, 1986, Ser. No. 874,118

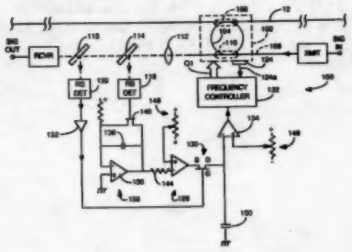
Int. Cl.[4] H04B *9/00*

U.S. Cl. 370—3 **42 Claims**

1. An optical communications system, comprising:

an optical pathway for propagating information bearing light signals;

at least first and second terminal devices coupled to said optical pathway for effecting communications through said optical pathway, each of said terminal devices including a controllable resonant structure controlled to support a plurality of resonant modes occurring at respective resonant mode frequencies;



means for propagating a reference signal onto said optical pathway, said reference signal varying in frequency between at least a first and one other reference frequency in a periodic manner; and

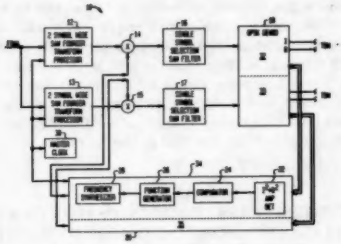
means for controlling said resonant structure of each of said terminal devices to support resonant modes at respective resonant mode frequencies having a selected frequency relationship with at least one of the first and one other reference frequency.

4,715,029

FDMA COMMUNICATIONS CHANNEL SYNCHRONIZER

Rex J. Crookshanks, Palos Verdes Estates, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 2, 1986, Ser. No. 881,432
Int. Cl.[4] H04J 4/00
U.S. Cl. 370—70 **4 Claims**



1. A method of synchronizing an FDMA signal constituted by nonsynchronized channels having a common predetermined symbol period, said method comprising the steps of:

(a) receiving said FDMA signal;

(b) sampling said FDMA signal over pairs of adjacent symbol periods to obtain samples;

(c) Fourier transforming each said sample so as to obtain a series of pulses extending over a common bandwidth;

(d) frequency translating each of said pulses by a translation frequency, said translation frequency being the sum of a respective frequency and a dither having a cycle two symbol periods in duration, so that the frequency translated pulses share a common frequency range substantially half that of their common bandwidth;

(e) filtering said pulses to exclude frequencies outside said common frequency range;

(f) detecting and storing the amplitudes of said pulses;

(g) forming a discriminate for each FDMA channel by comparing amplitudes of successive pulses corresponding to that channel; and

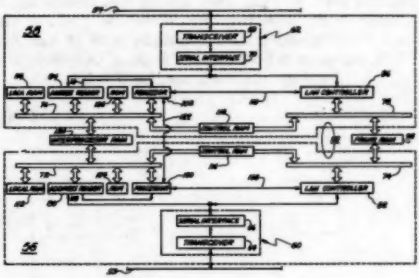
(h) adjusting each said translation frequency of step d in response to said discriminate.

4,715,030

LOCAL AREA NETWORK BRIDGE

Steven R. Koch, Seabrook, Md.; Charles R. Stein, Schenectady, N.Y.; William T. Hatfield, Schenectady, N.Y.; Neil R. Shapiro, Schenectady, N.Y., and William C. Hughes, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 4, 1986, Ser. No. 892,618
Int. Cl.[4] H01J 3/02
U.S. Cl. 370—85 **24 Claims**



1. Apparatus for establishing a bridge between a pair of communication networks, each of said networks being adapted to carry bit-serial message frames between devices coupled thereto, each said message frame having a leading portion including an address portion, said apparatus comprising:

a pair of bridge sides each coupled to a respective one of said networks for transmitting and receiving message frames to and from its associated communication network;

memory means, accessible by said bridge sides, for retrievably storing message frames;

each of said bridge sides including:

interface means for receiving an incoming message frame from or transmitting an outgoing message frame to its associated communication network;

processor means for determining whether said incoming message frame is transmissible from one of said networks to the other, said processor means providing a first signal upon determining said incoming message frame is transmissible;

said processor means providing a second signal effective to initiate the transmission of said outgoing message frame;

controller means for directing said incoming message frame from said interface means to said memory means, said controller means responsive to said second signal to direct said outgoing message frame from said memory means to said interface means;

means for reading and storing the address portion of said incoming message frame concurrently with said controller means directing said incoming message frame to said memory means, the stored address portion being immediately accessible by said processor means for determining the transmissibility of said incoming message frame;

said pair of bridge sides coupled together such that each of said bridge sides can function as either a receiving bridge side for receiving said incoming message frame or a transmitting bridge side for transmitting said outgoing message frame; and

upon said processor means on said receiving bridge side providing said first signal, said processor means on said transmitting bridge side responsively providing said second signal to said controller means on said transmitting bridge side;

whereby said receiving bridge side address reading means reads and stores said address portion, said receiving bridge side processor means having immediate access to said address portion to determine therefrom the transmissibility of said incoming mesage frame concurrently with said controller means directing said incoming message frame to said memory means.

4,715,031

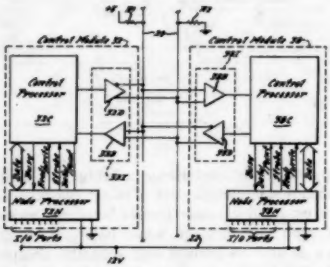
VEHICULAR DATA TRANSFER COMMUNICATION SYSTEM

Robert D. Crawford, Plymouth; Wayne J. Johnson, Dearborn Heights, both of Mich.; Theo Kimber, Jr., Huntsville, Ala.; Douglas Nolff, Scio Township, Washtenau County, Mich.; Jack R. Volk, and Donald C. Franks, both of Ann Arbor, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Sep. 23, 1985, Ser. No. 779,200

Int. Cl.[4] H04J *3/02*

U.S. Cl. 370—85 **6 Claims**



1. A data transfer communication system comprising:

a common data bus;

a plurality of communication control modules;

each control module having an unique identifying address and being programmed to perform one or more predetermined functions;

each control module being connected to said data bus and each containing means for receiving and means for transmitting data messages from or to other control modules on said common data bus;

each control module includes means for formatting data messages for transmitting on said common data bus into one of at least two types of messages each of which includes in sequence, a common but unique START signal of a predetermined field length to indicate the start of a data message transmission, a PRIORITY signal of a second predetermined field length to indicate the code of the relative degree of priority the formatted data message has for transmission on a predetermined hierarchy of priority, a TYPE CONTROL signal of a third predetermined field length to indicate the code of which one of said at least two types of data messages is being formatted for transmission, a FUNCTION or RECEIVER ADDRESS signal of a fourth predetermined field length indicating the code of the function to be performed by other control modules connected to said data bus or the unique identifying address of a specific control module intended to received the data message; and

each control module further contains means for storing its unique identifying address and function codes of the specific predetermined functions it is programmed to control.

4,715,032

METHOD AND APPARATUS FOR THE CONNECTION OF A CLOSED RING THROUGH A TELEPHONE EXCHANGE

Olof E. Nilsson, Rönninge, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

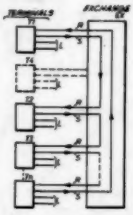
PCT No. PCT/SE84/00220, § 371 Date Jan. 16, 1985, § 102(e) Date Jan. 16, 1985, PCT Pub. No. WO84/05009, PCT Pub. Date Dec. 20, 1984

PCT Filed Jun. 8, 1984, Ser. No. 692,029

Claims priority, application Sweden, Jun. 9, 1983, 8303284

Int. Cl.[4] H04J *3/00*; H08Q *3/00*

U.S. Cl. 370—86 **5 Claims**



1. In the utilization of a digital telecommunication system including an exchange including connecting circuits adapted for being controlled by signals, and a plurality of terminals including at least three terminals, each of said terminals including a send channel and a receive channel, a method of connecting the terminals in a closed loop so that any pair of terminals can communicate comprising the steps of physically connecting the channels of each terminal to the exchange, and establishing communication between any pair of said terminals by coupling all of the terminals in series in a closed loop such that the pair of terminals communicate with each other through intervening of said terminals in said loop, said establishing communication being effected by connecting the send channel of each of the terminals to the receive channel of the next sequential of the terminals in said loop by controlling the connecting circuits of the exchange to connect the same until said closed loop is formed, transmitting from each terminal of the pair to the other terminal of the pair through said loop, and adding a further terminal to said loop by physically connecting the further terminal to the exchange and, within the exchange, signalling the connecting circuits to connect the send and receive channels of the further terminal respectively to the receive and send channels of two other terminals in the loop so as to include the further terminal in the loop.

4,715,033

STATE INFORMATION COMMUNICATION IN A TDMA SATELLITE COMMUNICATION NETWORK WITH HIGH FRAME AVAILABILITY

Akio Saburi, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed May 13, 1985, Ser. No. 733,714

Claims priority, application Japan, May 14, 1984, 59-96147

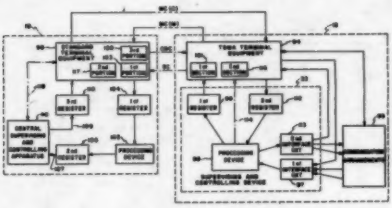
Int. Cl.[4] H04Q *11/04*; H04J *3/06*

U.S. Cl. 370—104 **11 Claims**

1. An arrangement for sending information about the operational state of a terrestrial station in a time division multiple access satellite communication network, said arrangement comprising at least one earth station and at least one standard earth station which periodically generates standard bursts; each of said standard bursts defining a time division multiple access frame consisting of said standard burst and a remaining part; said remaining part comprising a first and a second part; said first part being for transmission of data bursts which are produced by said terrestrial station, said at least one earth station, and said at least one standard earth station; said terrestrial station including communication devices for transmitting

the data bursts produced by said terrestrial station and for receiving the data bursts produced by said at least one earth station and said at least one standard earth station; said communication devices having a plurality of supervisory conditions which are to be monitored and which specify the states of operation of said communication devices;

collecting means for collecting, one at a time, a set of state information signals; each of said sets of state information



signals being representative of at least one of said operational states of said communication devices; and

signal sending means responsive to a collected signal from said collecting means for sending said collected signal in a predetermined part which is selected in said second part with reference to each of said standard bursts and in common to said terrestrial station and said at least one earth station.

4,715,034

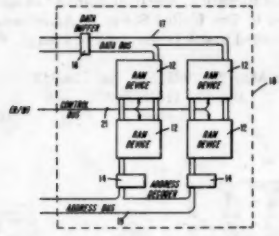
METHOD OF AND SYSTEM FOR FAST FUNCTIONAL TESTING OF RANDOM ACCESS MEMORIES

David M. Jacobson, Seattle, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Mar. 4, 1985, Ser. No. 708,749

Int. Cl.[4] G06F *11/26*

U.S. Cl. 371—21 **24 Claims**



14. Apparatus for fault testing a random access memory system having a plurality of memory cells, each being nominally uniquely addressable, comprising:

reversible pseudorandom bit generation means for generating a reversible pseudorandom bit sequence;

means for addressing the cells of said memory through selectively first and second address sequences;

means for writing said psuedorandom bit sequence into said memory through said first address sequence;

means for reading the contents of said memory through said second address sequence while controlling said pseudorandom bit generation means to generate said pseudorandom bit sequence in reverse, and for comparing said contents read with expected contents of cells in said second address sequence obtained from said pseudorandom bit sequence in reverse to detect any differences;

means responsive to differences detected by said comparing means for identifying memory faults; and

means for indicating said faults.

4,715,035

METHOD FOR THE SIMULATION OF AN ERROR IN A LOGIC CIRCUIT AND A CIRCUIT ARRANGEMENT FOR IMPLEMENTATION OF THE METHOD

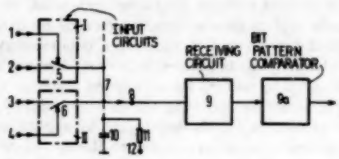
Michael Boehner, Neubiberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 16, 1986, Ser. No. 852,661

Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519606

Int. Cl.[4] G06F *11/22*; G01R *31/28*

U.S. Cl. 371—23 **17 Claims**



1. A method for simulating an error in a logic circuit which is designed for optionally connecting two logic levels to a bus via at least two input circuits which include switch elements which receive input bit patterns, comprising the steps of:

constructing a simulation model containing an error corresponding to simultaneously connecting both logic levels to the bus, including a logic circuit model, first and second bus model versions which are selectively useable with the logic circuit model;

applying an input bit pattern to the logic circuit model, producing undefined logic level and imaging the undefined logic level to a first logic level with the first bus model version;

applying the input bit pattern to the logic circuit model, producing the undefined logic level and imaging the undefined logic level to a second logic level; and

comparing the output bit patterns with error-free reference bit patterns.

4,715,036

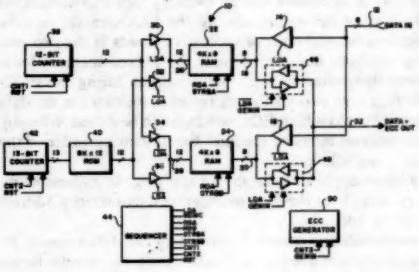
DATA ENCODER SYSTEM

Alan E. Oakes, Lexington, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed May 16, 1986, Ser. No. 864,588

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—37 **8 Claims**



1. An encoding device for implementing an encoding scheme in which an error-correction-code (ECC) generator is employed to generate from a sector of sequentially received data words an output block comprising the data words and ECC words generated from groups of data words within the sector, the encoding scheme including a processing order in

which the sequence of data words in at least some of the groups is different from the sequence in which the words are received so that the data words must be applied to the ECC generator in a processing sequence that is different from the sequence in which the data words are received, the encoding device comprising:

A. a device input port for receiving device input signals representing successive data words in a sector of data words for which error-correction coding is to be generated;

B. a data memory having a plurality of data-memory locations and adapted for application of address signals and data signals thereto, the data memory being operable to store in data-memory locations designated by address signals applied thereto data represented by data signals applied thereto and to produce a data-memory output representing the data stored in the data-memory locations designated by address signals applied thereto;

C. input means for operating the data memory, by application of address signals thereto and by application of the device input signals as data signals thereto, to store in the data memory the data words represented by the device input signals;

D. an ECC generator, having a generator input port and a generator output port, for receiving at the generator input port a generator input representing a succession of data words and for producing at the generator output port a generator output representing ECC words generated from groups of the data words represented by the generator input;

E. generator input means for applying the data-memory output to the generator input port during predetermined ECC-generation time periods for generation of ECC words therefrom;

F. generator output means for applying the generator output as data signals to the data memory during predetermined ECC-storage time periods to store in the data memory the ECC words represented by the generator output;

G. a device output port;

H. device output means for applying to the device output port, during predetermined output time periods, the data-memory output;

I. a counter for producing a counter output representing periodically incremented count values; and

J. an address memory, including a plurality of address-memory locations and connected to receive the counter output as address-memory address signals, for generating address-memory outputs representing the contents of address-memory locations specified by address-memory address signals applied thereto, the address memory containing in successive address-memory locations designated by the counter output during the ECC-generation time periods the addresses of successive words in the processing sequence and containing in the address-memory locations designated by the counter output during the ECC-storage time periods the addresses of locations in the data memory into which ECC words are to be stored, whereby the address memory specifies the processing order of the encoding scheme;

K. address-application means for applying the address-memory outputs to the data memory as data-memory address signals; and

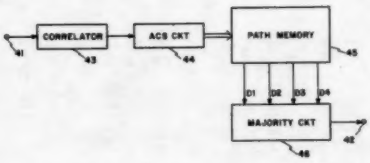
L. output-address means for operating the data memory by application of a sequence of address signals thereto during the predetermined output time periods to produce a data-memory output representing an output block comprising the data words and ECC words generated therefrom in accordance with the encoding scheme, whereby the output means applies to the output port signals representing an output blockgenerated in accordance with the encoding scheme.

4,715,037

VITERBI DECODER COMPRISING A MAJORITY CIRCUIT IN PRODUCING A DECODED SIGNAL

Toshiharu Yagi, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Feb. 25, 1985, Ser. No. 705,073
Claims priority, application Japan, Feb. 27, 1984, 59-36820
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—43 **2 Claims**



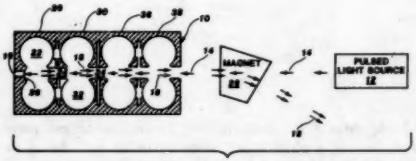
1. A Viterbi decoder for use in producing a decoded signal by correcting and decoding convolutional codes in synchronism with a succession of time slots, said Viterbi decoder including a path memory for memorizing, at each of said time slots, survivor paths in terms of information bits associated with the respective survivor paths of a predetermined number of time slots, and a majority circuit consisting of a read-only memory for deciding a decoded datum of said decoded signal for each of the time slots to provide a predetermined one of said information bits 0 and 1 in response to a majority of said information bits and to provide a predetermined one of said information bits 0 and 1 in response to a tie situation where the number of said information bits 0 equals the number of said information bits "1".

4,715,038

OPTICALLY PULSED ELECTRON ACCELERATOR

John S. Fraser, and Richard L. Sheffield, both of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 20, 1985, Ser. No. 736,033
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—2 **14 Claims**



1. An optically pulsed electron accelerator comprising:

a. a pulsed light source for providing discrete incident light pulses;

b. a photoemissive source for receiving the light pulses emitted by said pulsed light source and for emitting electron bursts having substantially the same duration as the incident light pulses; and

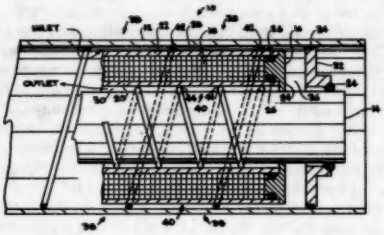
c. a first radio frequency-powered accelerator cell for accelerating electron bursts emitted by said photoemissive electron source, said first radio frequency-powered accelerator cell having portions defining a cavity traversed by the electron bursts and having an inside wall on which said photoemissive electron source is disposed, said first radio frequency-powered accelerator cell having portions defining a first aperture through which the electron bursts leave said first radio frequency-powered accelerator cell.

4,715,039

INTERNAL RESONATOR WATER COOLED ION LASER

Mike F. Miller, and Kim M. Gunther, both of Mountain View, Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Jul. 12, 1985, Ser. No. 754,497
Int. Cl.[4] H01S 3/00
U.S. Cl. 372—37 17 Claims



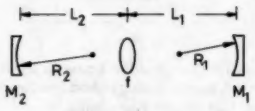
1. An integrated resonator tube-magnet-laser tube apparatus for an ion laser, comprising:
a resonator tube;
a magnet concentrically mounted in a spaced relationship within the resonator tube and defining between the magnet and resonator an outer coolant flow channel;
a plasma tube concentrically mounted in a spaced relationship within the magnet and defining between the magnet and plasma tube an inner coolant flow channel.

4,715,040

LASER SYSTEM

Chun-Shen Lee, Torrance, Calif., assignor to Amada Engineering & Service Co., Inc., La Mirada, Calif.

Filed Apr. 11, 1985, Ser. No. 722,078
Int. Cl.[4] H01S 3/08
U.S. Cl. 372—98 5 Claims



1. The method of outputting a laser beam with predetermined beam profile, comprising the steps of:
providing a pair of mirrors defining an optical cavity;
disposing a laser medium in the optical cavity; and inserting an optically aberrated element into the optical cavity so that an optical resonator containing the aberrated element exhibits high power loss in a local region of a beam cross section where the magnitude of beam intensity is substantially zero, and shows low power loss in the remaining region of the beam cross section where the magnitude of the beam intensity is finite.

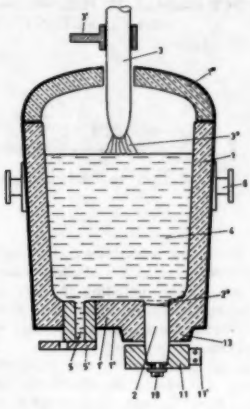
4,715,041

BATH ELECTRODE FOR POT FURNACE

Karl Bühler, and Anton Menth, both of Nussbaumen, Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jun. 20, 1985, Ser. No. 746,882
Claims priority, application Switzerland, Jul. 6, 1984, 3274/84
Int. Cl.[4] H05B 7/02
U.S. Cl. 373—72 10 Claims

1. A hot furnace comprising:
(a) a pot containing a melted metal having a surface;
(b) at least one power electrode;
(c) at least one bath electrode; and
(d) an external cooling device for cooling a cooling surface of said at least one bath electrode, wherein:
(e) the occurrence of a critical temperature (t^*) at said cooling surface of said at least one bath electrode is delayed by the provision of the extension of said at least one bath



electrode and a bulge of said pot surrounding said at least one bath electrode and
(f) the time during which said cooling surface of said at least one bath electrode remains below the critical temperature (t^*) in degrees K. at said cooling surface of said at least one bath electrode is determined by the formula:

$$\frac{t^* - t_K}{t_{max} - t_K} = 1 - \left\{ \frac{8}{\pi^2} \cdot \frac{l_A + l_Z}{l_A} \cdot \left[\sin^2 \frac{\pi \cdot l_A}{2(l_A + l_Z)} \cdot 1^{-2} \cdot e^{-\frac{12 \cdot \pi^2 \cdot \lambda \cdot T}{4c(l_A + l_Z)^2}} + \sin^2 \frac{3 \cdot \pi \cdot l_A}{2(l_a + l_Z)} \cdot 3^{-2} \cdot e^{-\frac{32 \cdot \pi^2 \cdot \lambda \cdot T}{4c(l_A + l_Z)^2}} + \sin^2 \frac{5 \cdot \pi \cdot l_A}{2(l_A + l_Z)} \cdot 5^{-2} \cdot e^{-\frac{52 \cdot \pi^2 \cdot \lambda \cdot T}{4c(l_A + l_Z)^2}} + \ldots \right] \right\}$$

wherein (t_{max}) is the temperature in degrees K. of said at least one bath electrode at the surface of the melted metal, (t_K) is the temperature in degrees K. at at said cooling surface of said at least one bath electrode at the beginning of uncoupling of the external cooling, (T) is the uncoupling time in seconds, (l_A) is the length of said at least one bath electrode from the surface of the melted metal to said cooling surface of said at least one bath electrode in meters, (l_Z) is the length of the extension of said at least one bath electrode beyond said cooling surface in meters, (λ) is the heat conductivity of said at least one bath electrode in W/K·m, and (c) is the specific heat capacity of said at least one bath electrode in W·s/m²·K.

4,715,042
FURNACE COOLING SYSTEM AND METHOD

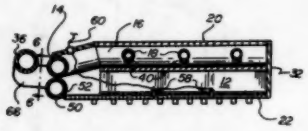
Ronald G. Heggart, Caledonia; Willard K. McClintock, Edison, and Randy J. Engstrom, Marion, all of Ohio, assignors to Union Carbide Corporation, Danbury, Conn.

PCT No. PCT/US85/01977, § 371 Date Aug. 8, 1986, § 102(e) Date Aug. 8, 1986, PCT Pub. No. WO86/02436, PCT Pub. Date Apr. 24, 1986

PCT Filed Oct. 15, 1985, Ser. No. 900,168

Int. Cl.[4] F27D *1/12*

U.S. Cl. 373—74 **26 Claims**



1. In a furnace or vessel for containing molten metal, said furnace or vessel having a roof and a sidewall, at least one of the roof and sidewall including an inner plate exposed to the heat of the metal and an outer plate spaced therefrom and defining with the inner plate an enclosed space therebetween the improvement comprising:

spray means extending into the enclosed space for directing a spray of fluid coolant against the inner plate for maintaining an acceptable temperature at the inner plate; and

pump means connected with the enclosed space for evacuating the fluid coolant from the enclosed space after the coolant is sprayed against the inner plate, whereby undesirable build-up of coolant and undesirable build-up of pressure of the coolant in the enclosed space are prevented.

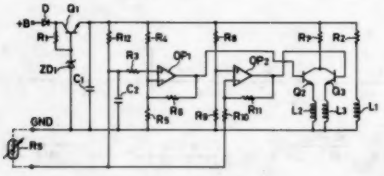
4,715,043
CROSS-COIL TYPE INDICATING INSTRUMENT

Hideo Chikasue, Shimada, Japan, assignor to Yazaki Corporation, Japan

Filed Aug. 22, 1986, Ser. No. 899,318

Int. Cl.[4] G08C *5/30*; H03K *17/96*

U.S. Cl. 374—184 **11 Claims**



1. A cross-coil type indicating instrument having a sensor having an output, a magnet, a plurality of mutually crossed coils wound around said magnet and connected to said output of said sensor, said instrument indicating a value of a detected physical quantity, as for example temperature, by means of a rotation of the magnet in response to an electrical signal that corresponds to the sensor output to the coils, comprising:

(i) a first coil which is wound so as to generate a predetermined magnetic field H_1 and to be continuously excited,

(ii) a second coil which is wound so as to generate a magnetic field H_2 that crosses the magnetic field H_1,

(iii) a third coil which is wound so as to generate a magnetic field H_3 that is approximately in the opposite direction to the magnetic field H_2,

(iv) a first control circuit having input terminals connected to said sensor and an output terminal connected to said second coil, for controlling only the current flow supplied to the second coil in accordance with a magnitude of the physical quantity detected by the sensor, said first control circuit controlling the current flow in such a manner that a magnitude of the current flow supplied to said second coil decreases with increase in the magnitude of the physical quantity detected until the magnitude of the physical quantity reaches a first reference value, and the current flow is interrupted after the magnitude of the physical quantity exceeds the first reference value, and

(v) a second control circuit having input terminals connected to said sensor and having an output terminal connected to said third coil, for controlling only the current flow supplied to the third coil in accordance with the magnitude of the physical quantity detected by the sensor, said second control circuit controlling the current flow in such a manner that the current flow is not supplied to the third coil until an increasing magnitude of the physical quantity reaches a second reference value being greater than the first reference value, and after the magnitude of the physical quantity exceeds the second reference value a current flow whose magnitude increases with increase in the magnitude of the physical quantity, is supplied to said third coil.

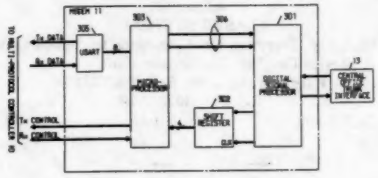
4,715,044
AUTOMATIC SYNCHRONOUS/ASYNCHRONOUS MODEM

William J. Gartner, Red Bank, N.J., assignor to American Telephone & Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Jul. 3, 1986, Ser. No. 881,721

Int. Cl.[4] H04L *27/02*

U.S. Cl. 375—8 **12 Claims**



1. A circuit for interposition between a communication line and a processor, said communication line having data transmission thereon, said circuit comprising

means for monitoring each new data transmission on said communication line for a preset interval at the start of said new data transmission,

means operable under control of said monitoring means for detecting whether a particular new data transmission is in synchronous format or in asynchronous format, and

means for providing a first signal when a new one of said data transmissions is detected as being synchronous and for providing a different signal when said new data transmission is detected as being asynchronous.

4,715,045
SYSTEM PROTOCOL FOR COMPOSITE SHIFT KEYING COMMUNICATION SYSTEM

Kenneth A. Lewis, Ridgefield, Conn.; Alan N. Alpern, Manhattan, N.Y.; Andrew C. Frank, and Stuart E. Ross, both of Danbury, Conn., assignors to GridComm, Inc., Danbury, Conn.

Continuation-in-part of Ser. No. 650,777, Sep. 13, 1984, Pat. No. 4,577,333. This application Mar. 17, 1986, Ser. No. 840,497

Int. Cl.[4] H04B *15/00*; H04L *27/10*; H04J *3/16*

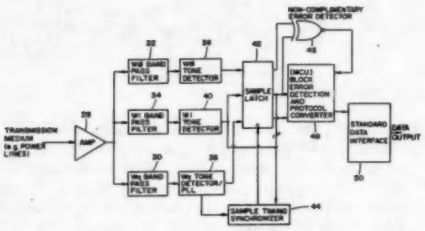
U.S. Cl. 375—58 **31 Claims**

1. A composite shift key method of communication for binary signals, comprising:

a. transmitting binary signals from a transmitting transceiver having a transmitter and a receiver by transmitting a first

summed signal having a first qualifying signal at a qualifying signal frequency Wqt as one of the summed signal components only when a binary signal, either a binary zero or a binary one, is desired to be transmitted, and algebraically summing a first frequency signal W1 with the first qualifying signal Wqt to produce a first summed signal which is transmitted when a binary one is desired to be transmitted, and by algebraically summing a second signal at a second frequency signal W0 with the qualifying signal Wqt to produce a second summed signal which is transmitted when a binary zero is desired to be transmitted, and ceasing transmission of the first qualifying signal at the qualifying signal frequency Wqt as a transmitted signal or as a component of a composite summed signal when neither a binary zero nor a binary one is desired to be transmitted;

b. receiving the transmitted signals at a receiving transceiver having a transmitter and a receiver, identifying a binary one signal only when the qualifying signal Wqt and the first frequency signal W1 are received simultaneously as



the first summed signal, and identifying a binary zero signal only when the qualifying signal Wqt and the second frequency signal W0 are received simultaneously as the second summed signal; and

c. signalling from the receiving transceiver to the transmitting transceiver when the first qualifying signal Wqt is received simultaneously with the first frequency signal W1 as the first summed signal or when the first qualifying signal Wqt is received simultaneously with the second frequency signal W0 as the second summed signal, that the binary signal transmission is being successfully received, by transmitting from the receiving transceiver a second qualifying signal Wqr, and dropping the transmission of the second qualifying signal Wqr when the first qualifying signal Wqt is not received simultaneously with the first frequency signal W1 as the first summed signal or when the qualifying signal Wqt is not received simultaneously with the second frequency signal W0 as the second summed signal, to signal to the transmitting transceiver that the binary signal transmission is not being successfully received.

4,715,046

FREQUENCY AGILE SIGNAL GENERATOR FOR EMULATING COMMUNICATIONS ENVIRONMENTS

Charles W. True, III, Annandale, and John K. Brady, Sterling, both of Va., assignors to Science Applications International Corporation, LaJolla, Calif.

Filed Jun. 20, 1986, Ser. No. 876,450
Int. Cl.[4] H04L *27/04, 27/12, 27/20*
U.S. Cl. 375—61 **19 Claims**

1. A signal generator for producing an output signal which emulates a communication signal of predetermined base frequency and modulation characteristics comprising:

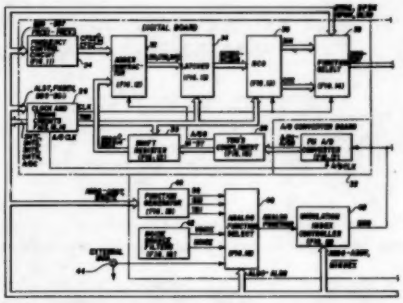
means for generating digital command signals specifying the desired characteristics of the output signal;

means responsive to said digital command signals for generating a digital base frequency signal representing the base frequency of the output signal;

means responsive to said digital command signals for generating an analog modulation signal having desired modulation characteristics;

means responsive to said analog modulation signal for generating a digital modulation signal representing a desired modulation of said base frequency signal;

means for selectively modulating said digital base frequency signal with said digital modulation signal to produce a modulated digital base frequency signal;



a digital-to-analog converter for converting the modulated digital base frequency signal to an analog output signal; and

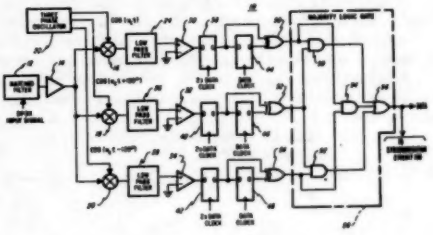
means for selectively modulating the amplitude of the analog output signal in response to said analog modulation signal.

4,715,047

DIGITAL DIFFERENTIAL PHASE SHIFT KEYED DEMODULATOR

Allan R. Hambley, Atlantic Mine, Mich., assignor to Harris Corporation, Melbourne, Fla.

Filed Apr. 4, 1986, Ser. No. 848,063
Int. Cl.[4] H04L *27/22*
U.S. Cl. 375—84 **33 Claims**



1. A differential phase shift keyed demodulator for recovering information from a phase modulated signal, comprising:

first means for dividing the XY vector phase plane into a plurality of sectors, wherein each one of said plurality of sectors is assigned a code, and for determining the sector in which the instantaneous phase of the phase modulated signal lies at a given time; and

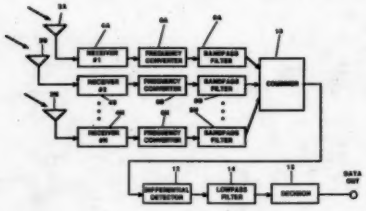
second means for comparing the instantaneous phase of the phase modulated signal at successive times, by comparing the sector code in which the instantaneous phase of the phase modulated signal lies at successive times wherein the phase difference as determined by the phase modulated signal being in different sectors, represents the information.

4,715,048

FREQUENCY OFFSET DIVERSITY RECEIVING SYSTEM

Tatsuro Masamura, Tokyo, Japan, assignor to Canadian Patents And Development Limited, Ottawa, Canada

Filed May 2, 1986, Ser. No. 858,915
Int. Cl.[4] H04B 7/08
U.S. Cl. 375—100 18 Claims



1. A diversity receiving system for receiving a digital signal transmitted at a predetermined signal symbol rate, comprised of:

(a) a plurality of spaced apart receivers, each including an antenna, for receiving said signal via a plurality of transmission paths, and means for frequency translating the received signal from respective ones of said receivers and generating respective intermediate signals having frequencies displaced from each other by an integral multiple of said signal symbol rate,

(b) means for combining said intermediate signals,

(c) differential detector means for receiving said combined signals and generating a plurality of output cross or dot product signals in response thereto,

(d) low pass filter means for filtering interference components of said cross product signals and generating a coherent signal in response thereto, and

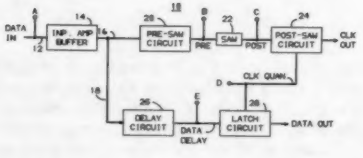
(e) decision circuit means for receiving said coherent signal and generating an output data signal in response thereto.

4,715,049

CLOCK RECOVERY AND RETIMING SCHEME WITH SAW FILTER PHASE TRIMMING TO ACHIEVE DESIRED SYSTEM PHASE ADJUSTMENT

George E. Andrews, Fleetwood; Paul C. Davis, Reading; Dennis C. Farley; Stanley H. Kravitz, both of Coopersburg; Thrygve R. Meeker, Allentown; Owe G. Petersen, Reading, and Arthur W. Schelling, Emmaus, all of Pa., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 12, 1986, Ser. No. 838,709
Int. Cl.[4] H04L 7/00
U.S. Cl. 375—106 5 Claims



1. Apparatus for recovering a clock signal from a received data signal and retiming said received data signal, said apparatus including

means for performing data retiming; and

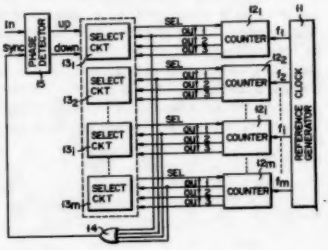
means for performing clock recovery, said means for performing clock recovery including a SAW filter configured to provide a phase delay ($\Delta\Phi$) equal to the difference in phase between the data retiming means ($\Phi_1 + \Phi_2$) and the clock recovery means exclusive of said SAW filter (Φ_3).

4,715,050

DIGITAL PHASE-LOCKED LOOP CIRCUIT

Koichi Tanaka, and Satoshi Itoh, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 9, 1987, Ser. No. 23,227
Claims priority, application Japan, Mar. 31, 1986, 61-71151
Int. Cl.[4] H03D 3/24; H04L 7/04
U.S. Cl. 375—111 6 Claims



1. A digital phase-locked loop circuit comprising:

a reference clock generator for generating an M, where M is an integer of 2 or more, number of reference clock inputs having a frequency substantially the same as N times, where N is an integer, the frequency of an input signal and sequentially phase-shifted by $2\pi/M$ radians;

an M number of counters for frequency dividing the M number of reference clock inputs, the respective counters being sequentially operated upon receipt of a selection signal and each delivering a first, second and third output signal in a predetermined timing relation;

a phase detector for making a phase comparison between the first output signal of a selected one of said M number of counters and said input signal and producing one of a first signal representing a phase delay of said first output signal of said selected counter and a second signal representing a phase advance of said first output signal of said selected counter; and

a selection circuit for receiving the signals of said phase detector and the output signals of said M number of counters and sequentially delivering the selection signal in a cyclic fashion in a predetermined direction to said M number of counters to decrease the phase difference between both the signals supplied to said phase detector so that the first output signal of the selected counter is used as a synchronization output signal.

4,715,051

ELECTRONIC POTENTIOMETER

Joseph J. Giardina, 32 Judson, Apt. 14B, Edison, N.J. 08817

Filed Apr. 12, 1985, Ser. No. 722,773
Int. Cl.[4] G06M 3/00; H03K 23/00, 21/08
U.S. Cl. 377—45 16 Claims

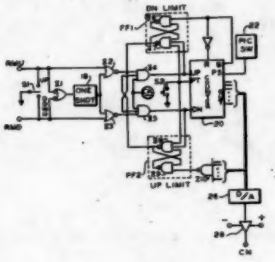
1. An adjuster for providing a potentiometric type of adjustment, comprising:

a control generator for providing a bidirectionally adjustable digital signal, the direction of adjustment of said digital signal being immediately reversible, said control generator having means for producing from and in response to said digital signal an adjusting signal which is analog and bidirectionally adjustable;

drive means coupled to said control generator for providing a drive signal in response to said adjusting signal, said drive means having a pair of sources of potential and a pair of variably conductive devices, said pair of variably conductive devices each having a control electrode and a pair

of controlled electrodes, each control electrode being commonly coupled to said control generator, each pair of controlled electrodes being separately coupled to a different corresponding one of said sources, and

a transducer means having an input coupled to said drive means and an output electrically isolated from said input, said output of said transducer means being operable to



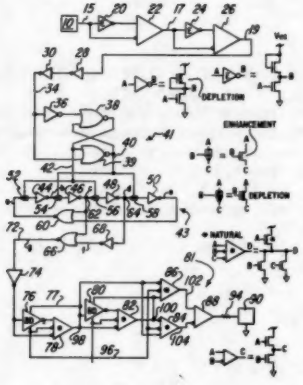
conduct by a variable amount in response to said adjusting signal to simulate potentiometric action, said transducer means comprising a pair of transducers serially connected to define three terminals of said output, each of said transducers having a transducer input, each of said pair of controlled electrodes of said drive means being separately coupled to a different corresponding one of said inputs of said transducers.

4,715,052

FREQUENCY DIVIDE BY N CIRCUIT

Mark A. Stambaugh, Missouri City, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 10, 1986, Ser. No. 838,066
Int. Cl.[4] H03K *21/10, 23/44, 23/44*
U.S. Cl. 377—108 **14 Claims**



1. A frequency divide by n circuit, where n is an odd integer, comprising:

means for splitting an incoming clock signal of frequency "f" into a first and a second clock signal, said first and second clock signals being nonoverlapping and complementary relative to one another, and having a frequency "f";

a shift register circuit comprising:

a first stage, having a pass gate therein which is controlled by said first complementary clock signal;

a second stage, having a pass gate therein which is controlled by said second complementary clock signal;

a plurality of intermediate stages, each of said intermediate stages having a pass gate therein which is controlled by one of said complementary clock signals, said intermediate stages connected in a series with said first and second stages with first and second complementary clock signals controlling pass gates in alternating stages; and

feedback logic having a first input connected to said second stage, having a second input connected to an intermediate stage in said series, and having an output connected to said first inverting stage, for providing a feedback signal to said first inverting stage, said feedback signal having a frequency of f/n; and

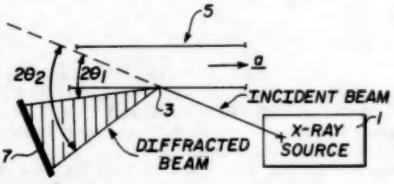
output logic, having a first input connected to one of said intermediate stages, and having a second input connected to an adjacent one of said intermediate stages, so that the output signal of said output logic has a frequency of f/n and a duty cycle corresponding to that of said incoming clock signal.

4,715,053

METHOD FOR MONITORING THE CRYSTALLOGRAPHIC TEXTURE OF METALLIC TUBES BY USE OF X-RAY DIFFRACTION

Robert J. Comstock, Penn Township, Westmoreland County, and George P. Sabol, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 25, 1985, Ser. No. 695,115
Int. Cl.[4] G01N *23/207*
U.S. Cl. 378—73 **25 Claims**



1. A process for characterizing the crystallographic texture of a surface of a metallic tube, by use of X-ray diffraction, comprising:

directing X-rays from a source, at an angle to the surface of the metallic tube, onto said metallic tube such that X-rays are diffracted therefrom;

detecting diffracted x-rays simultaneously over a predetermined range of scattering angles at a spaced location from said metallic tube with an electronic position-sensitive X-ray detector sufficient to detect said X-rays over the predetermined range of scattering angles;

effecting relative movement between said X-ray source and said metallic tube both in a rotational direction about the axis of the tube and in an axial direction; and

measuring intensities from multiple Bragg peaks of the diffracted X-rays included in the predetermined range of scattering angles detected by the position-sensitive X-ray detector from a plurality of locations on said tube.

4,715,054

PLASMA X-RAY SOURCE

Yasuo Kato, Zama; Kunio Harada, Hachioji; Shigeo Kubota, Kokubunji; Yoshio Watanabe, Tokyo, and Seiichi Murayama, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 7, 1985, Ser. No. 795,776
Claims priority, application Japan, Nov. 9, 1984, 59-234925
Int. Cl.[4] H01J *35/00;* **H05G** *1/00*
U.S. Cl. 378—122 **6 Claims**

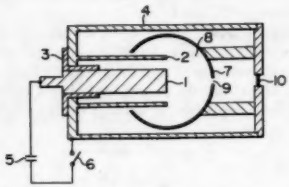
1. A plasma X-ray source comprising:

an inner cylindrical electrode;

an outer cylindrical electrode disposed coaxially and with a predetermined distance with respect to said inner cylindrical electrode;

an electrically insulating means disposed between an extremity of said inner cylindrical electrode and that of said outer cylindrical electrode corresponding thereto;

a discharge vessel disposed to envelop said inner and outer cylindrical electrodes;



means for applying a pulse voltage between said inner and outer cylindrical electrodes to produce plasma in said discharge vessel; and

an electrically conductive spherical shield disposed to envelop a space where said plasma is pinched, said electrically conductive spherical shield being maintained at a potential equal to that applied to said outer cylindrical electrode.

4,715,055

COMPOSITE ROTARY ANODE FOR X-RAY TUBE AND PROCESS FOR PREPARING THE COMPOSITE

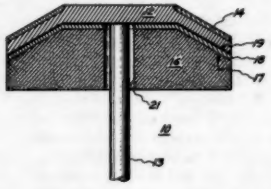
Thomas M. Devine, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 702,165, Feb. 15, 1985, Pat. No. 4,645,121. This application Aug. 25, 1986, Ser. No. 900,042

The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.

Int. Cl.[4] H01J *35/10*

U.S. Cl. 378—144 **10 Claims**



1. In an anode assembly for a rotating X-ray anode wherein a graphite body is joined to the surface of a metal component of said anode assembly, the metal of said metal component being selected from the group consisting of molybdenum, molybdenum alloys, tungsten and tungsten alloys, the improvement wherein said graphite body and the surface of said metal component are separated by a crack-free metallurgically bonded intermediate compound laminate, said compound laminate comprising a crack-free layer of carbide of metal from said metal component and a continuous layer of platinum or platinum alloy adjacent thereto, said layer of carbide being less than about 0.2×10^{-3} inch (0.0051 mm) thick and being metallurgically bonded to the surface of said metal component and said layer of platinum or platinum alloy being metallurgically bonded to said graphite body.

4,715,056

APPARATUS FOR SLIT RADIOGRAPHY

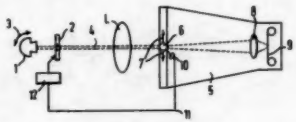
Hugo Vlasbloem, Maasland, and Simon Duinker, Bloemendaal, both of Netherlands, assignors to bv Optische Industrie "De Oude Delft", Delft, Netherlands

Filed Mar. 18, 1985, Ser. No. 713,198

Claims priority, application Netherlands, Mar. 16, 1984, 8400845

Int. Cl.[4] G21K *1/04*

U.S. Cl. 378—152 **26 Claims**



1. An apparatus for slit radiography, which comprises:

an X-ray source;

an X-ray detector for collecting radiation passing through a body to be radiographed;

a slit diaphragm positioned between said X-ray source and said body for forming a substantially planar X-ray beam;

a plurality of attenuating elements positioned along said slit diaphragm forming a plurality of attenuating sections;

means for scanning said body with said planar X-ray beam;

detection means cooperating with saisd X-ray detector and comprising a plurality of response sections juxtaposed along a direction of said slit diaphragm, each of said response sections being responsive to radiation collected on said X-ray detector to produce an electric signal representative of intensity of thus collected radiation, each of said response sections of said detection means corresponding to a respective attenuating section of said plurality of attenuating sections; and

means for simultaneously controlling each of said attenuating sections during scanning of said body in response to said electric signal produced at a respective response section of said detection means.

4,715,057

X-RAY APPARATUS WITH SPRING WEIGHT COMPENSATION

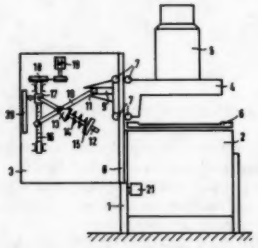
Alfred Hahn, Erlangen; Bodo Kamm, Moehrendorf; Karl Weiss, Buckenhof, and Johannes Dummert, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 1, 1986, Ser. No. 857,967

Claims priority, application Fed. Rep. of Germany, May 6, 1985, 8513305[U]

Int. Cl.[4] G01N *21/00, 21/34, 23/00*

U.S. Cl. 378—197 **9 Claims**



9. An x-ray apparatus comprising:

an x-ray source and an x-ray detector;

an apparatus base;

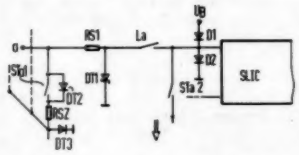
a tiltable part attached to said base;
guide rails mounted on said tiltable part;
a displaceable carriage supporting x-ray parts for moving along said guide rails on said tiltable part; said carriage having a slot-shaped opening therein;
a spring weight compensation device for said carriage for providing compensating forces adjustably dependent on the position of the tiltable part;
a load lever hinged to said tiltable part at one end and being displaceable in said slot-shaped opening at an opposite end;
a threaded spindle journaled for rotation about its longitudinal axis which is positioned generally parallel to the longitudinal axis of said guide rails;
a motor having a driving engagement with said spindle to cause said spindle to rotate about its longitudinal axis;
a nut captured on said spindle;
a rod pivotally attached at one end to said nut;
a sleeve slidingly carried on said rod intermediate the ends of said rods;
a spring carried on said rod engageable at one end with said sleeve and at an opposite end held fixed relative to said rod to urge said sleeve toward said nut;
said load lever being pivotally attached intermediate its ends to said sleeve such that said spring will provide a biasing force intermediate the ends of said load lever;
said nut being held against rotation so as to generate a reciprocating movement of said nut on said spindle upon operation of said motor;
an angle sensor operable to detect the angle of said tiltable part;
a length sensor operable to detect the position of said nut on said spindle;
a control circuit for controlling said motor; the output of said sensors being connected to said control circuit;
said motor, said spindle and said nut forming an arrangement for adjusting the biasing force of said spring by movement of said nut so as to generate the desired weight compensation for said carriage.

4,715,058

PROTECTIVE CIRCUIT FOR THE OVERVOLTAGE PROTECTION OF A SUBSCRIBER LINE INTERCONNECT CIRCUIT

Robert Lechner, Otterfing; Hans-Werner Rudolf, and Roland Krimmer, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 2, 1987, Ser. No. 20,809
Claims priority, application Fed. Rep. of Germany, Apr. 23, 1986, 3613721
Int. Cl.[4] H04M *7/00*; H02H *3/20*
U.S. Cl. 379—27 **5 Claims**



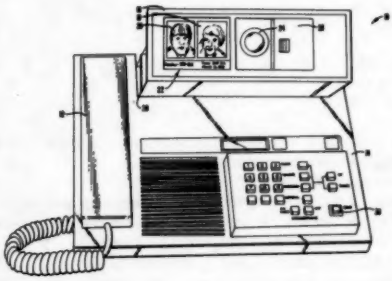
1. A protective circuit for providing overvoltage protection of a subscriber line interconnect circuit of a digital time multiplex-communication network having an electronic interface circuit and for providing overvoltage protection of the electronic switches associated with the subscriber line circuit for test accessibility, comprising:
means providing for each conductor of a core pair of the connected subscriber line circuit for each corresponding connection of the subscriber line interconnect circuit an isolation of the separate conductors of the core pair from the connected subscriber line circuit;
a separate test access connection to the conductors of the core pair to the corresponding connections of the active subscriber line interconnect circuits;
a threshold setting element connected between the line side of an isolation switch and an access switch for each conductor of the core pair of the subscriber line circuit for accessing one conductor of the core pair, of identical construction to that of the threshold setting element associated with the other conductor of the core pair such that overvoltages are conducted to ground potential both via a grounded terminal of the circuit and through a second threshold setting element bridging said access switches for accessing one conductor of the the core pair, which is connected to ground potential via a third threshold setting element.

4,715,059

CONVERSATIONAL VIDEO PHONE

Michael A. Cooper-Hart, Cupertino; Lawrence D. Emmons; James S. Mackley, both of Grass Valley, and David H. Stokes, Nevada City, all of Calif., assignors to Luma Telecom, Inc., Santa Clara, Calif.

Filed Nov. 7, 1985, Ser. No. 795,967
Int. Cl.[4] H04M *11/00*; H04N *7/14*
U.S. Cl. 379—53 **23 Claims**

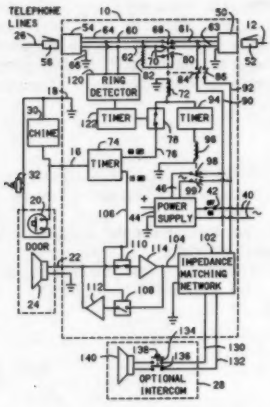


1. A conversational freeze-frame video phone for transmitting a single frame of a video gray scale source image over an ordinary telephone line, comprising:
camera means for capturing said video source image;
a memory coupled to said camera means for storing said single frame of said video source image;
means for mapping said video source image onto a video source image field of from 2000 to 5,000 pixels;
video source image display means for displaying said video source image field on a first display screen area having an area of approximately one square inch as a real time mirror image of said video source image;
means, coupled to said telephone line, for asynchronously transmitting a modulated signal representing said source image field in a burst having an approximate duration of three seconds or less;
means, coupled to said telephone line, for asynchronously receiving a modulated signal representing a remote video image field;
means for demodulating said received signal;
remote video image display means for displaying said remote image field on a second display screen area immediately adjacent said first display screen and having an area of approximately one square inch and adapted to display said remote video image field line by line as each line is received by said receiving means; and
means, coupled to said telephone line, for transmitting and receiving an audio signal.

4,715,060
DOOR MESSAGE APPARATUS WITH TELEPHONE ANSWERING DEVICE

Bernard N. Lipscher, and Kevin G. Coleman, both of 1342 Grant Street Station, Pittsburgh, Pa. 15230

Filed Jul. 15, 1985, Ser. No. 754,577
Int. Cl.[4] H04M *1/65;* G11B *31/00*
U.S. Cl. 379—70 8 Claims



1. A control unit for a combination telephone and door message apparatus, comprising

a message line,

means for connecting the message line to an automatic telephone answering and recording mechanism which responds to a ring signal on the message line to generate electrical audio signals on the message line by playing a prerecorded outgoing message and then to record electrical audio signals of an incoming message from the message line;

telephone line disconnecting means for normally connecting the message line to a telephone line such that the message playback and recording mechanism responds to a ring signal on the telephone line to transmit the prerecorded outgoing message on the telephone line and to record an incoming message from the telephone line;

door connecting means, normally disconnected from the message line, for connecting the message line to door speaker and microphone means to broadcast the outgoing message on the door speaker and microphone means and to generate the incoming message on the message line from the door speaker and microphone means;

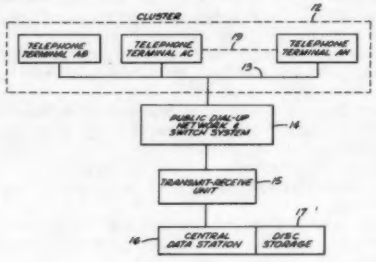
means adapted for connection to a doorbell switch to sense operation of the doorbell switch; and

means responsive to the sensing of the operation of the doorbell switch including means for operating the telephone line disconnectiong means to disconnect the telephone line from the message line, means for operating the door connecting means to connect the door speaker and microphone means to the message line, and means for generating a ring signal on the message line so that the automatic telephone answering and recording mechanism operates to transmit the prerecorded outgoing message over the message line to the door speaker and microphone means and to record a subsequent message on the message line from the door speaker and microphone means.

4,715,061
COORDINATED MULTIPLE TELEPHONE STATION SYSTEM

Daniel Norwich, Tampa, Fla., assignor to Telecredit, Inc., Los Angeles, Calif.

Filed May 30, 1986, Ser. No. 868,464
Int. Cl.[4] H04M *1/57*
U.S. Cl. 379—91 8 Claims



1. A cluster calling system for use with a dial-up telephone network to contact and interface a central data station for possible multiple inquiries during single dial-up, comprising:

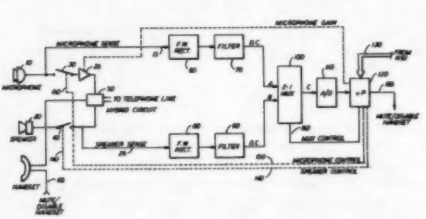
at least one cluster of telephone terminals adapted to be connected for accessing a call line of said dial-up telephone network, said terminals including means to formulate data signals for inquiries;

at least one transmit-receive unit adapted to be connected to said dial-up telephone network for individually interfacing said cluster of telephone terminals through said dial-up network and adapted to be coupled to said central data station, said transmit-receive unit further including means operable upon a dial-up communication with said cluster to poll each of said telephone terminals in said cluster for the existence and communication of data signals manifesting an inquiry to said central data station and to terminate communication with said cluster upon completion of a poll sequence of said telephone terminals absent the existence of data signals manifesting an inquiry to said central data station.

4,715,062
SPEAKERPHONE CONTROL CIRCUIT HAVING LOW GAIN STATES AND METHOD FOR CONTROLLING GAIN OF SPEAKERPHONE

Vincent V. Korsky, Shelton, and Raymond T. Pajer, Southbury, both of Conn., assignors to TIE/communications, Inc., Shelton, Conn.

Filed Mar. 22, 1985, Ser. No. 714,721
Int. Cl.[4] H04M *9/08*
U.S. Cl. 379—390 68 Claims



1. A speakerphone control circuit comprising:

first electronic switch means coupled between an input transducer of the speakerphone and a telephone line;

second electronic switch means coupled between an output transducer of the speakerphone and the telephone line;

first means for sensing the level of a first signal present on an output from the input transducer;

second means for sensing the level of a second signal transmitted to an input to the output transducer; and

control means coupled to said first and second sensing means and to said first and second electronic switch means for evaluating said first and second signals, said control means comprising means for determining whether said speakerphone should be in a first talk mode, a first listen mode, a low gain talk mode or a low gain listen mode, the first signal being attenuated in said low gain talk mode by a first control signal from said control means whereby said first electronic switch means is cyclically turned on and off and said second signal being attenuated in said low gain listen mode by a second control signal from said control means whereby said second electronic switch means is cyclically turned on and off.

second detecting means having a predetermined response characteristic varying by an amount opposite to said preselected amount in response to the detector control signal for detecting the presence of the microphone audio signals and producing an output signal;

first control means coupled to the output signal of said first detecting means for generating the gain control signal having a magnitude related to the output signal of said first detecting means, said first control means further including means coupled to to the first detecting means output signal for integrating the first detecting means output signal to produce an intergrated output signal, and means coupled to said integrating means for generating a gain control signal current having a magnitude related to the integrated output signal of said integrating means; and

second control means coupled to the output signal of said first detecting means and the output signal of said second detecting means for generating the detector control signal.

4,715,063

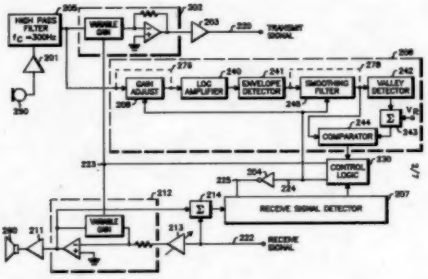
SPEAKERPHONE FOR RADIO AND LANDLINE TELEPHONES

Kenneth R. Haddad, Schaumburg, and Richard J. Vilmur, Palatine, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 767,543, Aug. 20, 1985, abandoned. This application Jul. 21, 1986, Ser. No. 889,301

Int. Cl.[4] H04M *9/08*

U.S. Cl. 379—390 **6 Claims**



1. A speakerphone including a microphone and a speaker and being coupled to a communications path for applying to said communications path microphone audio signals and applying incoming audio signals from said communications path to said speaker, said speakerphone further comprising:

first amplifying means having a gain varying in predetermined proportion with a gain control signal for amplifying the incoming audio signals;

second amplifying means having a gain varying in opposite proportion to said predetermined proportion with the gain control signal for amplifying the microphone audio signals;

first detecting means having a predetermined response characteristic varying by a pre-selected amount in response to a detector control signal for detecting the presence of the incoming audio signals and producing an output signal;

4,715,064

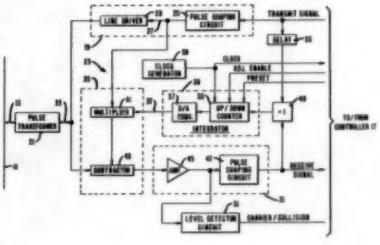
ADAPTIVE HYBRID CIRCUIT

Albertus M. G. Claessen, Montfoort, Netherlands, assignor to NCR Corporation, Dayton, Ohio

Filed Jun. 22, 1984, Ser. No. 623,302

Int. Cl.[4] H04B *3/03*

U.S. Cl. 379—392 **15 Claims**



1. An adaptive hybrid circuit coupled to a transmission line and between a transmitter and a receiver of a local station for adaptively cancelling a crosstalk component from said transmitter to said receiver, said adaptive hybrid circuit comprising:

means for comparing an output signal from said receiver with a transmitter signal to be transmitted by said transmitter to develop a first control signal which varies in amplitude as a function of the comparison of said output signal with said signal to be transmitted; and

adjustment means responsive to said control signal, said transmitter signal and a composite signal from said transmission line containing said crosstalk component from said transmitter and a received signal compnent for generating an estimate of said crosstalk component and combining the estimate with the composite signal to apply to said receiver a residual signal representing the received signal component.

4,715,065

APPARATUS FOR DISTINGUISHING BETWEEN SPEECH AND CERTAIN OTHER SIGNALS

John P. Parker, Crawley, United Kingdom, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 19, 1984, Ser. No. 601,839

Claims priority, application United Kingdom, Apr. 20, 1983, 8310708

Int. Cl.[4] G10L 3/00

U.S. Cl. 381—46 16 Claims

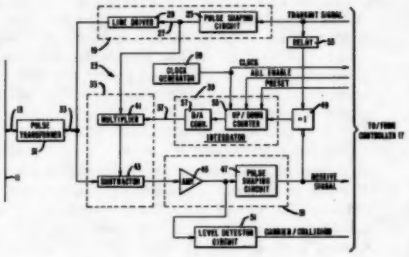
1. Apparatus for distinguishing between speech and non-speech signals present in an input signal, comprising

(a) an input for receiving said input signal;

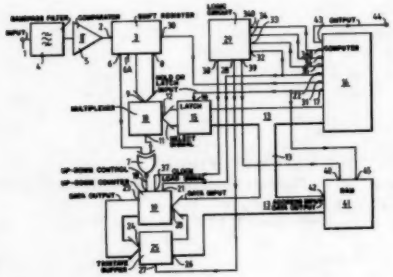
(b) means for forming, for each of successive time intervals of said input signals, a respective autocorrelogram signal from said input signal, each autocorrelogram signal extending over a range of delays having lower and upper limits;

(c) means for detecting the presence and delay, within respective autocorrelogram signals of peak values;

(d) means for comparing the delay, of said peak values in said autocorrelogram signals to determine whether the delays of said peak values are the same over successive autocorrelogram signals; and



(e) an output for indicating that the input signal contains speech when said delays of said peak values are not the same.



DESIGN PATENTS

GRANTED DEC. 22, 1987

ERRATA

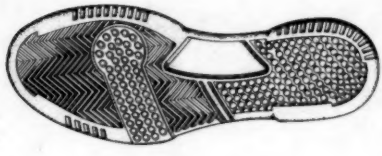
For CLASS	See PATENT NO.
D08-373	293,281
D03-062	293,287
D04-104	293,288
D14-102	293,328
D07-416	293,365

DESIGNS

DECEMBER 22, 1987

293,270
SHOE
Alfred D. Radford, Combe, England, assignor to Clarks Limited, Somerset, England
Filed Jul. 26, 1985, Ser. No. 759,437
Claims priority, application United Kingdom, Mar. 20, 1985, 1025669
Term of patent 14 years
U.S. Cl. D2—313

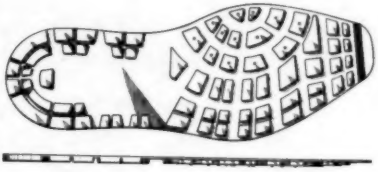
293,271
SHOE SOLE
Edward Lussier, Hingham, Mass., assignor to Reebok International, Ltd., Canton, Mass.
Filed Jul. 1, 1985, Ser. No. 750,596
Term of patent 14 years
U.S. Cl. D2—320



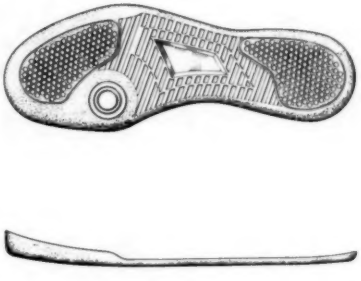
293,272
BOOT SOLE
Seel de Meij, Hogelandsingel 135, 7512 GD Enschede, Netherlands
Filed Aug. 16, 1985, Ser. No. 766,403
Claims priority, application Hague, Mar. 21, 1985, DM/004 962
Term of patent 14 years
U.S. Cl. D2—320

293,273
BOOT SOLE
Seel de Meij, Hogelandsingel 135, 7512 GD Enschede, Netherlands
Filed Aug. 16, 1985, Ser. No. 766,404
Claims priority, application Hague, Feb. 28, 1985, DM/004851
Term of patent 14 years
U.S. Cl. D2—320

293,274
SHOE SOLE
Brian F. Igoe, Wrentham, Mass., assignor to Reebok International, Ltd., Canton, Mass.
Filed Jul. 1, 1985, Ser. No. 750,278
Term of patent 14 years
U.S. Cl. D2—320



293,275
SHOE SOLE
Jeffrey P. Bua, Duxbury, Mass., assignor to Reebok International, Ltd., Canton, Mass.
Filed Sep. 6, 1985, Ser. No. 773,321
Term of patent 14 years
U.S. Cl. D2—320



293,276

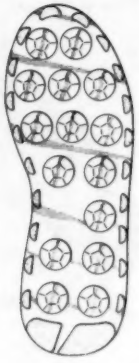
SHOE SOLE

Ellen Schmidt-Devlin, Beaverton, and Stephen D. Gomez, Portland, both of Oreg., assignors to Nike, Inc., Beaverton, Oreg.

Filed Aug. 21, 1985, Ser. No. 767,839

Term of patent 14 years

U.S. Cl. D2—321



293,277

SHOE TREE

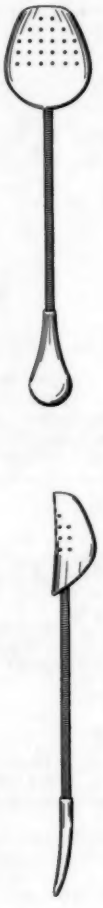
Norbert Schmid, Fellbach, Fed. Rep. of Germany, assignor to Norbert Schmid KG, Fellbach, Fed. Rep. of Germany

Filed Apr. 19, 1984, Ser. No. 602,192

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1983, MR 965

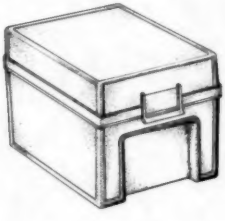
Term of patent 14 years

U.S. Cl. D2—314.1

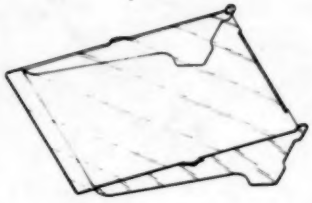


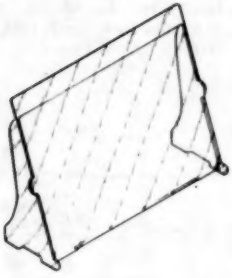
293,278
COLLAR
Harold J. Smith, 3828 Bobstone Dr., Sherman Oaks, Calif. 91423
Filed Aug. 26, 1985, Ser. No. 769,600
Term of patent 14 years
U.S. Cl. D2—602

293,279
DISKETTE FILE BOX
Dale M. Evans, Windsor, Wis., assignor to Don Evans, Inc., DeForest, Wis.
Filed Aug. 12, 1985, Ser. No. 764,721
Term of patent 14 years
U.S. Cl. D3—35



293,280
COMBINATION SIGN CARD AND PHOTOGRAPH HOLDER
Richard M. Liptak, Parma Heights, Ohio, assignor to Integral Design, Inc., Cleveland, Ohio
Continuation-in-part of Ser. No. 524,389, Aug. 18, 1983, Pat. No. Des. 282,182. This application Apr. 12, 1985, Ser. No. 722,401
Term of patent 14 years
U.S. Cl. D6—314

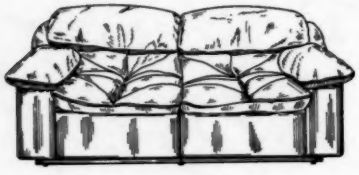




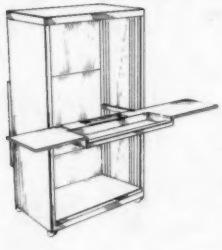
293,281
ORNAMENT HANGER
Susan M. White, 4737 N. Lowell, Chicago, Ill. 60630
Filed Jul. 12, 1985, Ser. No. 754,429
Term of patent 14 years
U.S. Cl. D8—373

293,282
PORTABLE SEAT
L. James Ashford, 11876 Colby Chase Rd., Florissant, Mo. 63033
Filed Oct. 15, 1984, Ser. No. 662,432
Term of patent 14 years
U.S. Cl. D6—368

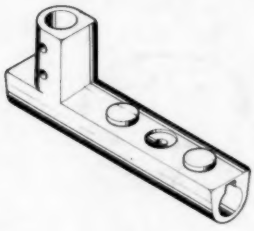
293,283
SOFA
Marco Formenti, Via Monte Basso 8, Seregno, Italy (20038)
Filed Feb. 13, 1984, Ser. No. 579,557
Claims priority, application Italy, Sep. 9, 1983, 22948/83[U]
Term of patent 14 years
U.S. Cl. D6—381



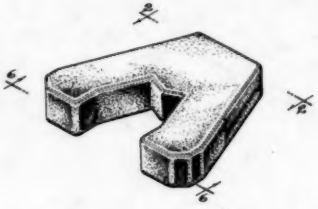
293,284
COMPUTER WORKSTATION
David Wright, Shrewsbury, and Richard M. Latino, Holden, both of Mass., assignors to Wright Line Inc., Worcester, Mass.
Filed Feb. 4, 1985, Ser. No. 697,665
Term of patent 14 years
U.S. Cl. D6—425



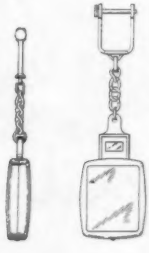
293,285
CONNECTOR FOR ATTACHING AN INFANT SEAT TO A TABLE
Chin-Chou Ho, 58 Ching Fong Street, Taipei, Taiwan
Filed Jul. 23, 1985, Ser. No. 758,158
Term of patent 14 years
U.S. Cl. D6—491



293,286
SEAT CUSHION
Jaroslaw G. Alfer, 1331 Lilac Ter., Los Angeles, Calif. 90026
Filed Jun. 10, 1985, Ser. No. 742,958
Term of patent 14 years
U.S. Cl. D6—596

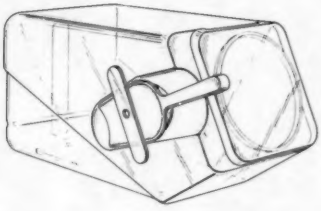


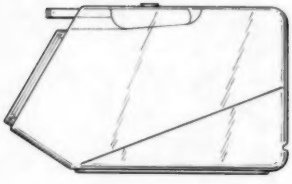
293,287
COMBINED KEY RING, TORCH, PHOTOGRAPH HOLDER AND LCD WATCH
Michele Cauque, Paris, France, and Avry Ben-Zeev, Kowloon, Hong Kong, assignors to Sparklight Corporation, Kowloon, Hong Kong
Filed Mar. 20, 1985, Ser. No. 713,800
Claims priority, application United Kingdom, Sep. 20, 1984, 84 1 022 166/86
Term of patent 14 years
U.S. Cl. D3—62

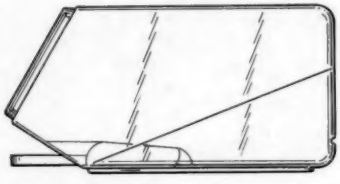


293,288
TOOTHBRUSH
Kenneth D. Cron, Glen Head, and Nannette Sauvigne', Great Neck, both of N.Y., assignors to STL, Enterprises, Glen Head, N.Y.
Filed Jul. 2, 1986, Ser. No. 881,465
Term of patent 14 years
U.S. Cl. D4—104

293,289
COMBINATION FOOD CONTAINER AND SCOOP
Peter Edwards, Hayward; Budd Steinhilber, Stinson Beach, and Ken Gilliam, San Francisco, all of Calif., assignors to Harmony Foods, Inc., Santa Cruz, Calif.
Filed May 12, 1986, Ser. No. 862,599
Term of patent 14 years
U.S. Cl. D7—79





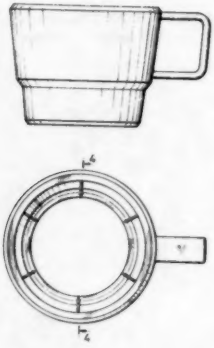


293,290
MUG
Young O. Kim, 969 Helen Dr., Millbrae, Calif. 94030
Filed Jun. 27, 1985, Ser. No. 749,524
Claims priority, application Rep. of Korea, Apr. 29, 1985, 4871
Term of patent 14 years
U.S. Cl. D7—8

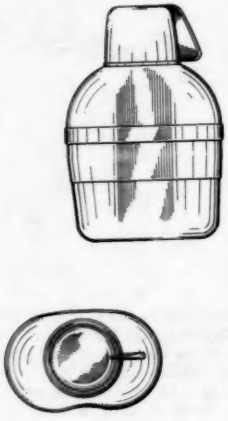
293,291
PUNCH CUP
Erik L. Hansen, Roskilde, Denmark, assignor to Rosti A/S, Denmark
Filed May 8, 1985, Ser. No. 731,799
Term of patent 14 years
U.S. Cl. D7—9

293,292
COVERED ENTREE PLATE
Charles E. Finsilver, Hartsdale; Terry L. Taylor, Pound Ridge, both of N.Y.; Roger E. Worm, Minneapolis, Minn., and Nabil El-Hag, Putnam Valley, N.Y., assignors to General Foods Corporation, White Plains, N.Y.
Filed Aug. 23, 1985, Ser. No. 768,667
Term of patent 14 years
U.S. Cl. D7—16

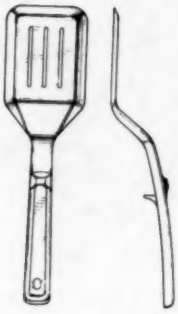
293,293
CUP HOLDER
Patricia J. Isles, 14a Fieldhouse Road, Balham, London SW12, United Kingdom
Filed Jan. 9, 1985, Ser. No. 689,857
Claims priority, application United Kingdom, Jul. 17, 1984, 1020969
Term of patent 14 years
U.S. Cl. D7—70



293,294
VACUUM BOTTLE
Mamoru Fujiyama, Osaka, Japan, assignor to Zojirushi Vacuum Bottle Co., Ltd., Osaka, Japan
Filed Feb. 5, 1985, Ser. No. 698,494
Claims priority, application Japan, Sep. 19, 1984, 59-38893
Term of patent 14 years
U.S. Cl. D7—77

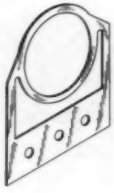


293,295
TURNER
Stanley A. Johnson, Brookfield, Wis., assignor to The Vollrath Company, Sheboygan, Wis.
Filed Mar. 18, 1985, Ser. No. 712,869
Term of patent 14 years
U.S. Cl. D7—102



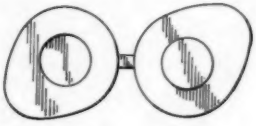
293,296
TORCH FOR EXOTHERMIC CUTTING ELECTRODES
David B. Chaney, Powell, Ohio, assignor to Arcair Company, Lancaster, Ohio
Filed Aug. 1, 1984, Ser. No. 636,524
Term of patent 14 years
U.S. Cl. D8—30

293,297
HANGER FOR A CYLINDRICAL CONTAINER
Nimrod P. Wood, 11102 NE. Beech, Portland, Oreg. 97220
Filed Aug. 19, 1985, Ser. No. 766,560
Term of patent 14 years
U.S. Cl. D8—373



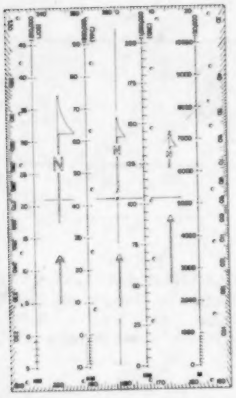
293,298
PACKAGING CONTAINER
David Picard, Chemin des Marais 158, 1255 Veyrier, and Albert Petter, Chemin Moise Duboule 31, 1209 Geneva, both of Switzerland
Filed Jun. 5, 1985, Ser. No. 741,736
Claims priority, application Hague, Dec. 17, 1984, DM/004535
Term of patent 14 years
U.S. Cl. D9—322

293,299
DOUBLE LID FOR A CONTAINER
Boris Parad, 847 Division St., Northbrook, Ill. 60062
Filed Dec. 7, 1984, Ser. No. 679,583
Term of patent 14 years
U.S. Cl. D9—446

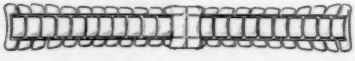


293,300
WRISTWATCH
Takashi Nikaido, Tachikawa; Yoshio Ono, Oume, and Masao Wada, Chofu, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jun. 3, 1985, Ser. No. 740,546
Claims priority, application Japan, Dec. 10, 1984, 59-50732
Term of patent 14 years
U.S. Cl. D10—32

293,301
BAR SCALE TEMPLATE
Michael H. Deering, 114 London La., Jacksonville, N.C. 28540
Filed May 30, 1985, Ser. No. 739,095
Term of patent 14 years
U.S. Cl. D10—62

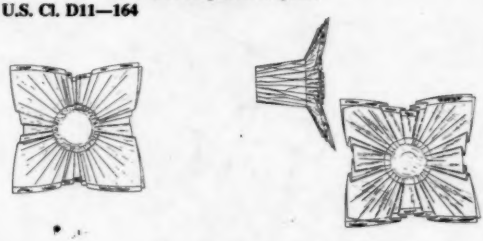


293,302
WRIST WATCH BAND
Eddy Schoepfer, La Chaux-du-Milieu, Switzerland, assignor to Fabrique Ebel, Societe Anonyme, Switzerland
Filed Apr. 3, 1985, Ser. No. 719,314
Claims priority, application Hague, Oct. 4, 1984, DM/004260
Term of patent 14 years
U.S. Cl. D11—3



293,303
NECKLACE
Marina Bulgari, Athens, Greece, assignor to Marina B Creation S.A., Vaduz, Liechtenstein
Filed Jun. 4, 1985, Ser. No. 740,985
Term of patent 14 years
U.S. Cl. D11—3

293,304
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 653,018
The portion of the term of this patent subsequent to Dec. 22, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D11—164



293,305

FLOWER POT COVER

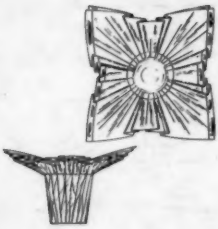
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 652,727

The portion of the term of this patent subsequent to Dec. 22, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D11—164



293,306

FLOWER POT COVER

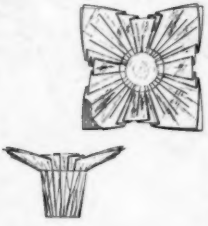
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 653,015

The portion of the term of this patent subsequent to Dec. 15, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D11—164



293,307

FLOWER POT COVER

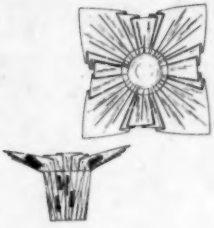
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.

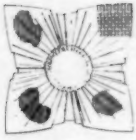
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 653,204

The portion of the term of this patent subsequent to Oct. 6, 2001, has been disclaimed.

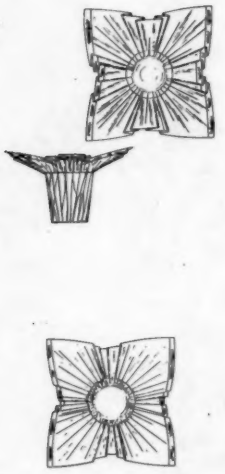
Term of patent 14 years

U.S. Cl. D11—164

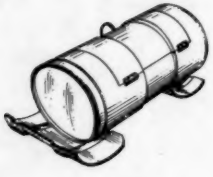




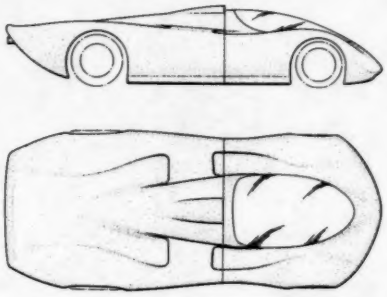
293,308
FLOWER POT COVER
Donald E. Weder; Erwin H. Weder, both of Highland, and Robert C. Abrams, Edwardsville, all of Ill., assignors to Highland Supply Corporation, Highland, Ill.
Continuation-in-part of Ser. No. 613,053, May 22, 1984. This application Sep. 21, 1984, Ser. No. 652,726
Term of patent 14 years
U.S. Cl. D11—164



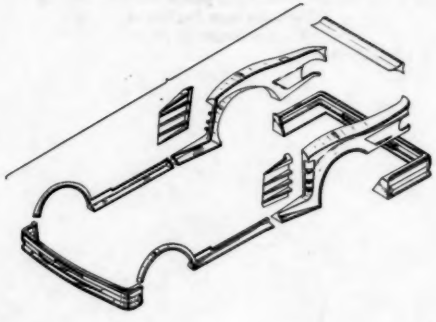
293,309
UTILITY SLED
James R. Robertson, 284 N. Amherst Rd., Bedford, N.H. 03102, and Harold E. Charles, 1 Woodland Dr., Manchester, N.H. 03104
Filed Feb. 21, 1985, Ser. No. 704,062
Term of patent 14 years
U.S. Cl. D12—6



293,310
VEHICLE BODY
Gary N. Clark, Taylor; Kirk H. Jones, Troy, and Edward T. Welburn, Jr., Detroit, all of Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Sep. 13, 1985, Ser. No. 776,129
Term of patent 14 years
U.S. Cl. D12—90

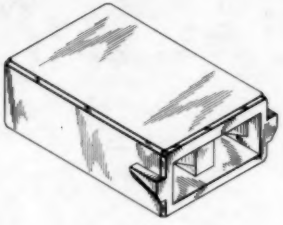


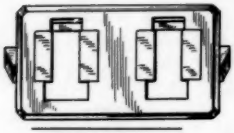
293,311
EXTERIOR BODY PANEL KIT FOR ATTACHMENT TO AN AUTOMOBILE BODY
Vittorio Strosek, Utting, Fed. Rep. of Germany, assignor to Silver Star Motors, Inc., Pompano Beach, Fla.
Filed Feb. 20, 1985, Ser. No. 703,592
Term of patent 14 years
U.S. Cl. D12—169



293,312
MOTORCYCLE FRONT FENDER EXTENSION
Alwin J. Stabel, St. Paul, Minn., assignor to Drag Specialties, Inc., Minnetonka, Minn.
Filed Oct. 31, 1985, Ser. No. 793,620
Term of patent 14 years
U.S. Cl. D12—186

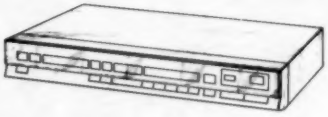
293,313
ELECTRICAL CONNECTOR HOUSING
Joseph G. Justiano, Bethpage, and Wolfgang F. Bienwald, Melville, both of N.Y., assignors to Leviton Manufacturing Company, Inc., Little Neck, N.Y.
Filed Nov. 2, 1984, Ser. No. 667,772
Term of patent 14 years
U.S. Cl. D13—27





293,314
WORK STATION SPINE ASSEMBLY
Bruce P. Hannah, Cold Spring, N.Y.; David D. McClanahan, Lansdale, and Lee Denny, Quakertown, both of Pa., assignors to Knoll International, Inc., New York, N.Y.
Filed Jun. 8, 1984, Ser. No. 618,491
Term of patent 14 years
U.S. Cl. D13—40

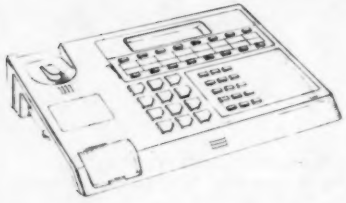
293,315
TELEVISION TUNER
Yosuke Suzuki, Yokohama, and Takahide Sano, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Mar. 14, 1985, Ser. No. 711,649
Term of patent 14 years
U.S. Cl. D14—84



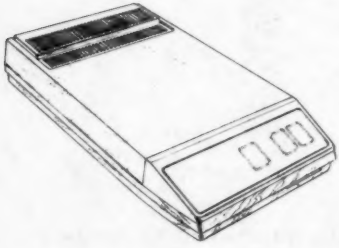
293,316
PORTABLE CASSETTE PLAYER
Richard Demenus, New York, N.Y., assignor to Acoustiguide Corporation, New York, N.Y.
Filed Jul. 24, 1985, Ser. No. 758,455
Term of patent 14 years
U.S. Cl. D14—6

293,317
DIGITAL TELEPHONE AND DATA EXCHANGE EQUIPMENT CABINET
Mitsuhiro Umezu; Tooru Nakajima; Hiroshi Kikkawa, and Mamoru Miyazaki, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Mar. 12, 1986, Ser. No. 842,890
Claims priority, application Japan, Sep. 12, 1985, 60-38774
Term of patent 14 years
U.S. Cl. D14—52

293,318
TELEPHONE BASE WITH KEYBOARD DIALING MEANS
Robin Rhodes, Nottingham, England, assignor to Plessey Overseas Limited, Essex, England
Filed Feb. 10, 1986, Ser. No. 827,853
Claims priority, application United Kingdom, Aug. 17, 1985, 1028670
Term of patent 14 years
U.S. Cl. D14—62

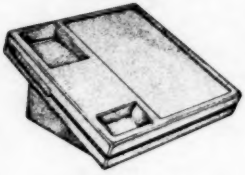


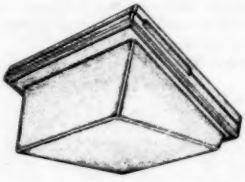
293,319
TELECONFERENCE CONTROL UNIT
Hari Matsuda, Evanston, and Carl J. Whitaker, Wheeling, both of Ill., assignors to Shure Brothers, Inc., Evanston, Ill.
Filed Nov. 4, 1985, Ser. No. 803,869
Term of patent 14 years
U.S. Cl. D14—52



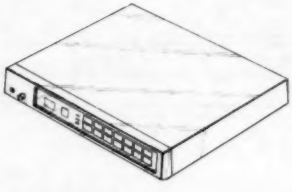
293,320
MULTI-LINE TELEPHONE SET
Daniel H. Ng, Huntington Beach, Calif., assignor to New Generation Technology, Huntington Beach, Calif.
Filed Jan. 27, 1986, Ser. No. 822,594
Term of patent 14 years
U.S. Cl. D14—58

293,321
TELEPHONE STAND
John Kowalik, Freehold; Ronald Longhitano, Oldbridge Township, Middlesex County; Stephen G. Miggels, Wyckoff; Walter J. Shakespeare, Middletown, and G. Varadarajan, Englishtown, all of N.J., assignors to American Telephone & Telegraph Company, AT&T Information Systems Inc., Murray Hill, N.J.
Filed Jun. 19, 1986, Ser. No. 876,383
Term of patent 14 years
U.S. Cl. D14—60

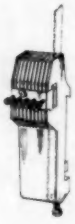




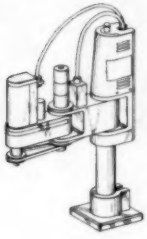
293,322
AUDIO TUNER
Naoko Hoshino; Takashi Abe, both of Chiba, and Yosuke Suzuki, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Apr. 12, 1985, Ser. No. 722,446
Term of patent 14 years
U.S. Cl. D14—71



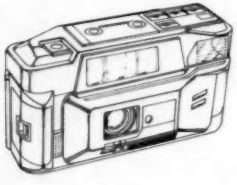
293,323
KNIFE HOLDER FOR TUFTING MACHINES
Ian Slattery, Hixson, Tenn.; Harold B. Bardsley, Euxton, Near Chorley, and Ian Beverly, Blackburn, both of England, assignors to Spencer Wright Industries, Inc., Chattanooga, Tenn.
Filed May 17, 1985, Ser. No. 735,216
Claims priority, application United Kingdom, Apr. 2, 1985, 1025927
Term of patent 14 years
U.S. Cl. D15—78



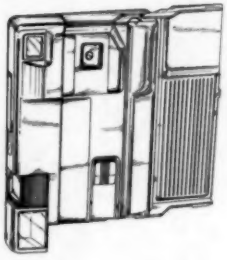
293,324
INDUSTRIAL ROBOT
Atsuyuki Gotou, Mitaka; Masato Shibayama, Sayama; Takeshi Abe, Tokyo; Ryouichi Hisatomi, and Takeshi Sasaki, both of Tochigi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 28, 1985, Ser. No. 770,242
Claims priority, application Japan, Jul. 17, 1985, 60-30202
Term of patent 14 years
U.S. Cl. D15—199



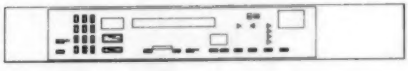
293,325
CAMERA
Takaharu Kato, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed May 30, 1985, Ser. No. 739,136
Claims priority, application Japan, Nov. 30, 1984, 59-049296
Term of patent 14 years
U.S. Cl. D16—6



293,326
CAMERA
Bruce A. Leonard, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jun. 24, 1985, Ser. No. 747,734
Term of patent 14 years
U.S. Cl. D16—6

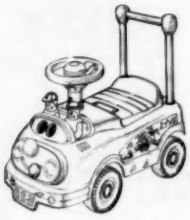


293,327
CONTROL PANEL FOR A COPIER OR THE LIKE
W. Patrick Fricke, and Larry D. Harrison, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 18, 1985, Ser. No. 712,818
Term of patent 14 years
U.S. Cl. D16—32



293,328
SUNGLASSES
Marvin G. Murphy, 34 E. Las Flores, Arcadia, Calif. 90016, and Mark A. Hase, 1421 S. 5th Ave., Arcadia, Calif. 91006
Filed Apr. 2, 1986, Ser. No. 847,811
Term of patent 14 years
U.S. Cl. D14—102

293,329
TOY VEHICLE
Shinroku Nakao, Kanagawa; Yoshiyasu Ishii, and Taira Hanashima, both of Tokyo, all of Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Oct. 21, 1985, Ser. No. 789,981
Claims priority, application Japan, May 27, 1985, 60-22085
Term of patent 14 years
U.S. Cl. D21—78

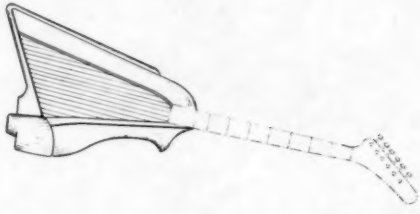


293,330
STUFFED TOY BEAR
Leigh C. Latta, III, Joseph, Oreg., assignor to The Dexter-Portfolio Co., Joseph, Oreg.
Filed Jun. 6, 1985, Ser. No. 741,952
Term of patent 14 years
U.S. Cl. D21—159

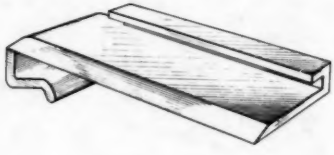
293,331
GUITAR
Mark Erlewine, 1605 Wethersfield Rd., Austin, Tex. 78703, and William Squier, c/o Silverman & Shulman, 136 E. 57th St., New York, N.Y. 10022
Filed Aug. 8, 1985, Ser. No. 763,511
Term of patent 14 years
U.S. Cl. D17—14

293,332
GUITAR
David Wintz, 2042 Portsmouth, Houston, Tex. 77098
Filed Nov. 25, 1985, Ser. No. 806,358
Term of patent 14 years
U.S. Cl. D17—14

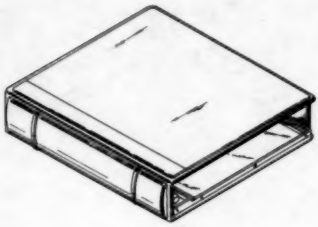
293,333
ELECTRIC GUITAR BODY
Richard Excellente, 1018 Brighton St., Union, N.J. 07083
Filed Oct. 28, 1985, Ser. No. 791,745
Term of patent 14 years
U.S. Cl. D17—20

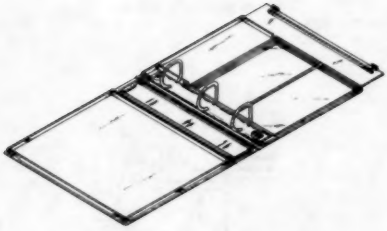


293,334
PAPER GUIDE CLIP
James R. Humbert, P.O. Box 3677, South Bend, Ind. 46628
Filed Nov. 21, 1985, Ser. No. 806,008
Term of patent 14 years
U.S. Cl. D18—22

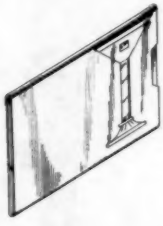


293,335
CASE FOR MAGNETIC MEDIA, PROGRAMS AND THE LIKE
Robert A. Egly, 38 Whitewater Dr., Corona del Mar, Calif. 92625
Filed Jun. 8, 1984, Ser. No. 618,531
Term of patent 14 years
U.S. Cl. D19—27





293,336
COCKTAIL COMPOSER GUIDE
Paul A. Fenner, P.O. Box 38, Guildford, Surrey GU1 1DR, England
Filed Dec. 11, 1984, Ser. No. 680,493
Term of patent 14 years
U.S. Cl. D19—64



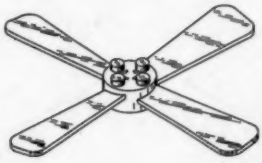
293,337
PAPER CLIP
Fred Burgdorf, 46711 Crawford #15, Fremont, Calif. 94539
Filed Jun. 20, 1985, Ser. No. 746,632
Term of patent 14 years
U.S. Cl. D19—65

293,338
STAMP DISPENSER
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Mar. 21, 1985, Ser. No. 714,571
Term of patent 14 years
U.S. Cl. D19—67

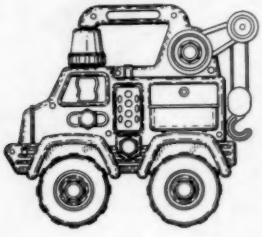
293,339
SIGNBOARD
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Nov. 4, 1985, Ser. No. 794,412
Term of patent 14 years
U.S. Cl. D20—10

293,340
SCOOTER
Mort Heilig, Monterey Park, Calif., assignor to Supercruiser, Inc., Monterey Park, Calif.
Filed Feb. 2, 1987, Ser. No. 9,832
Term of patent 14 years
U.S. Cl. D21—81

293,341
TOY PROPELLER
Jan Ryaa, Billund, and Edel S. Andersen, Randbol, both of Denmark, assignors to Interlego A.G., Baar, Switzerland
Filed Dec. 4, 1985, Ser. No. 805,193
Term of patent 14 years
U.S. Cl. D21—108

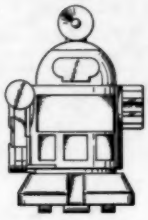


293,342
TOY TOW TRUCK
Harry S. Thomson, Richmond; David M. Raffo, and John A. Pape, both of Hitchin, all of England, assignors to Hestair Kiddicraft Limited, Great Britain
Filed Feb. 19, 1985, Ser. No. 702,487
Claims priority, application United Kingdom, Jan. 14, 1985, 1024392
Term of patent 14 years
U.S. Cl. D21—139

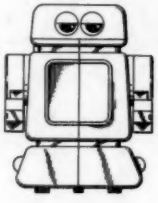


293,343
STUFFED TOY FERRET
Leigh C. Latta, III, Joseph, Oreg., assignor to The Dexter-Portfolio Co., Joseph, Oreg.
Filed Jun. 6, 1985, Ser. No. 741,951
Term of patent 14 years
U.S. Cl. D21—148

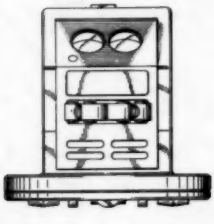
293,344
TOY ROBOT
Masami Shiraishi, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 7, 1985, Ser. No. 795,826
Claims priority, application Japan, May 10, 1985, 60-19123
Term of patent 14 years
U.S. Cl. D21—150



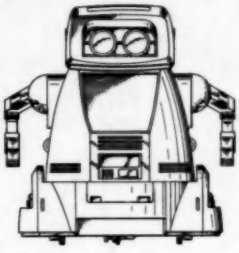
293,345
TOY ROBOT
Toshiaki Takizawa, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 7, 1985, Ser. No. 795,828
Claims priority, application Japan, May 10, 1985, 60-19124
Term of patent 14 years
U.S. Cl. D21—150

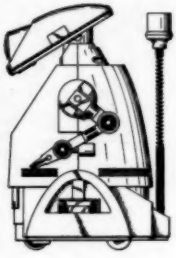


293,346
TOY ROBOT
Hiroshi Horiuchi, Toyko, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 7, 1985, Ser. No. 795,829
Claims priority, application Japan, May 17, 1985, 60-20439
Term of patent 14 years
U.S. Cl. D21—150



293,347
TOY ROBOT
Keiichi Murasaki, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 7, 1985, Ser. No. 795,831
Claims priority, application Japan, May 17, 1985, 60-20441
Term of patent 14 years
U.S. Cl. D21—150

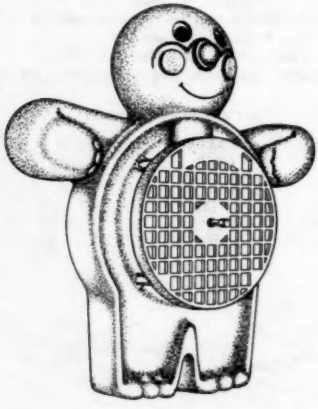




293,348
SWIMMING FROG TOY
Michael Tong, Hong Kong, Hong Kong, assignor to Playart Limited, Hong Kong, Hong Kong
Filed Apr. 23, 1985, Ser. No. 726,256
Claims priority, application United Xingdom, Oct. 24, 1984, 1022842
Term of patent 14 years
U.S. Cl. D21—158

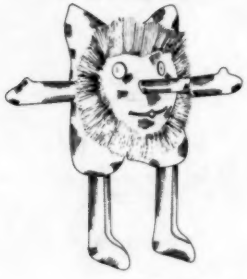
293,349
CLOTH BAR
Rhonda K. Zidell, 3903 Beaconsdale Dr., Austin, Tex. 78759
Filed Jun. 3, 1985, Ser. No. 740,345
Term of patent 14 years
U.S. Cl. D21—159

293,350
TOY FIGURE
Douglas L. Fetterman, Rochester, Mich., assignor to Kenner Parker Toys Inc., Beverly, Mass.
Filed Mar. 11, 1985, Ser. No. 710,769
Term of patent 14 years
U.S. Cl. D21—166

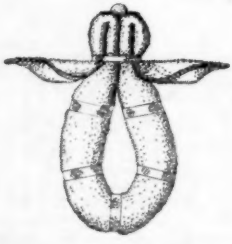


293,351
DOLL
Linda L. Calkin, R.D. 3, Box 708, Stockton, N.J. 08559
Filed Jun. 24, 1985, Ser. No. 748,411
Term of patent 14 years
U.S. Cl. D21—166

293,352
DOLL
Linda L. Calkin, R.D. 3, Box 708, Stockton, N.J. 08559
Filed Jun. 24, 1985, Ser. No. 748,410
Term of patent 14 years
U.S. Cl. D21—166



293,353
CLOTH BEE
Rhonda K. Zidell, 3903 Beaconsdale Dr., Austin, Tex. 78759
Filed Jun. 3, 1985, Ser. No. 740,350
Term of patent 14 years
U.S. Cl. D21—185



293,354

SHOULDER AND BACK WEIGHT FOR EXERCISING

Preston Nelson, 3400 Ocee St., Houston, Tex. 77063

Filed Jul. 25, 1985, Ser. No. 758,862

Term of patent 14 years

U.S. Cl. D21—196

293,355

PUTTER HEAD

Gordon D. Wampler, 302 Sutton Bridge Rd., Box 701, Gadsden, Ala. 35901

Filed Aug. 26, 1985, Ser. No. 780,591

Term of patent 14 years

U.S. Cl. D21—218

293,356

FLOATATION AID

Lawrence Holden, 4954 Hazeltine, Sherman Oaks, Calif. 91403

Filed Sep. 20, 1985, Ser. No. 778,472

Term of patent 14 years

U.S. Cl. D21—238

293,357

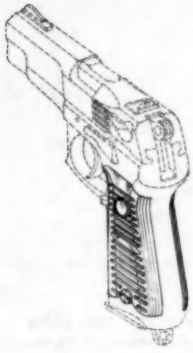
SET OF GRIP PANELS FOR A HANDGUN

William B. Ruger, Croydon, N.H., and Lawrence L. Larson, Branford, Conn., assignors to Sturm, Ruger & Company, Inc., Southport, Conn.

Filed Dec. 19, 1984, Ser. No. 683,786

Term of patent 14 years

U.S. Cl. D22—108



293,358

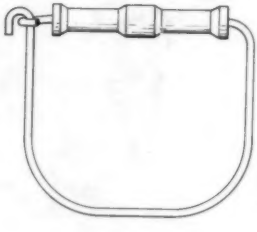
FISH CARRIER

David E. Hearn, 6512 SE. 50th Ave., Portland, Oreg. 97206

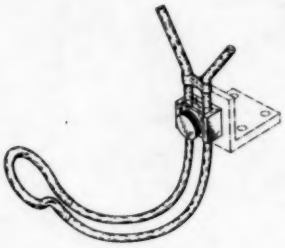
Filed May 30, 1985, Ser. No. 739,307

Term of patent 14 years

U.S. Cl. D22—134

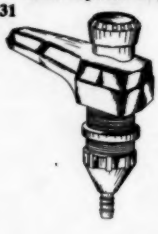


293,359
ADJUSTABLE FISHING ROD SUPPORT
James M. Gust, Box 205, and Ronald L. Yoder, Box 227, both of Topeka, Ind. 46571
Filed Jan. 16, 1985, Ser. No. 692,656
Term of patent 14 years
U.S. Cl. D22—147

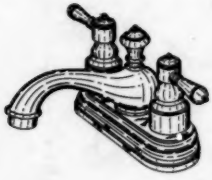


293,360
ELEVATED WATER TANK
Lloyd E. Anderson, Sr., Des Moines, Iowa, assignor to Pitt-Des Moines Inc., Pittsburgh, Pa.
Filed Apr. 3, 1985, Ser. No. 719,431
Term of patent 14 years
U.S. Cl. D23—202

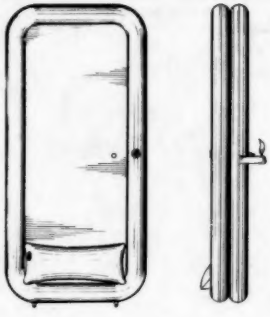
293,361
GALLEY HAND PUMP
Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.
Filed May 6, 1985, Ser. No. 730,794
Term of patent 14 years
U.S. Cl. D23—231



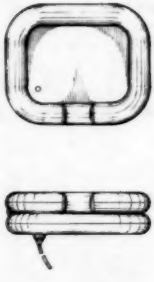
293,362
FAUCET
Charles P. Hill, Indianapolis, and Anthony G. Spangler, Sheridan, both of Ind., assignors to Masco Corporation of Indiana, Taylor, Mich.
Filed Jul. 12, 1985, Ser. No. 754,603
Term of patent 14 years
U.S. Cl. D23—241



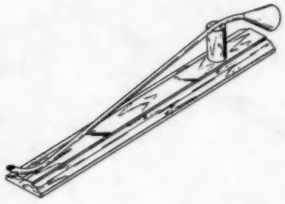
293,363
INFLATABLE BATHTUB
Lloyd Everard, 15824 SE. 296th, Kent, Wash. 98042
Filed Sep. 16, 1985, Ser. No. 776,428
Term of patent 14 years
U.S. Cl. D23—277



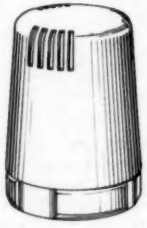
293,364
INFLATABLE SINK
Lloyd Everard, 15824 SE. 296th, Kent, Wash. 98042
Filed Oct. 4, 1985, Ser. No. 784,540
Term of patent 14 years
U.S. Cl. D23—289



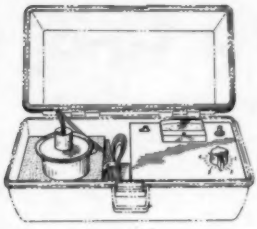
293,365
WICK BEARING LIGHTING DEVICE
Ivan T. George, 566 Ridge Cir., Huntingdon Brook, Pa.
Filed Feb. 11, 1985, Ser. No. 700,794
Term of patent 14 years
U.S. Cl. D7—416



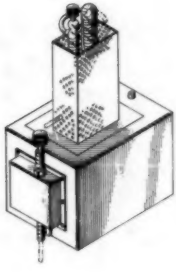
293,366
AIR FRESHENER
William J. O'Neil, Jr., Cincinnati; David A. Jones, Kettering, both of Ohio, and Phillip L. Brookshire, Cincinnati, all of Ohio, assignors to The Drackett Company, Cincinnati, Ohio
Filed Apr. 9, 1985, Ser. No. 721,356
Term of patent 14 years
U.S. Cl. D23—366



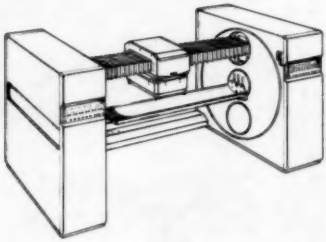
293,367
WATER TREATMENT UNIT FOR CONTAINMENT IN A PORTABLE HOUSING
John Spink, Chesterfield, Mo., assignor to Scienco, Inc., St. Louis, Mo.
Filed Sep. 9, 1985, Ser. No. 774,147
Term of patent 14 years
U.S. Cl. D23—207



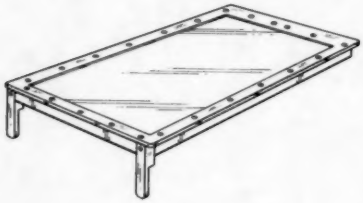
293,368
MICROWAVE DISTILLATION APPARATUS
Narbik A. Karamian, Bethesda, Md., assignor to Raf-Tan Inc., Bethesda, Md.
Filed Apr. 8, 1985, Ser. No. 720,852
The portion of the term of this patent subsequent to Dec. 8, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—207



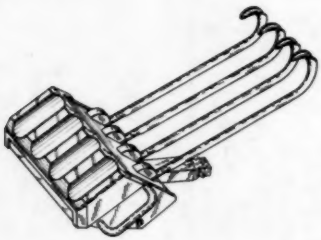
293,369
MEDICAL DIAGNOSTIC POSITIONER FOR DIAGNOSTIC IMAGING OR TOMOGRAPHY
Allan J. Perusek, Mentor; Ernest F. Jablonski, W. Farmington, and Robert H. Hartzell, North Royalton, all of Ohio, assignors to Technicare Corporation, Solon, Ohio
Filed May 22, 1985, Ser. No. 736,906
Term of patent 14 years
U.S. Cl. D24—2



293,370
SURGICAL TABLE FOR SUPPORT OF THE ARM AND HAND
Ronald A. Sanderson, Calabasas; John L. Wilson, North Hollywood, and Nolan M. Maples, Burbank, all of Calif., assignors to Cal-Surgical, Inc., Sun Valley, Calif.
Filed Feb. 8, 1985, Ser. No. 700,010
Term of patent 14 years
U.S. Cl. D24—3

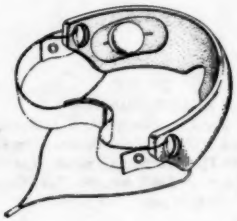


293,371
DENTAL HANDPIECE SUPPORT UNIT
Carl G. Nordstrom, Newberg, and Matthew H. Parlier, Sheridan, both of Oreg., assignors to A-Dec, Inc., Newberg, Oreg.
Filed Dec. 16, 1985, Ser. No. 808,996
Term of patent 14 years
U.S. Cl. D24—5

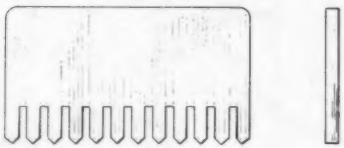


293,372
DENTAL PICK
Thomas E. Butt, 350 W. Fulton St., Wytheville, Va. 24382
Filed Apr. 18, 1985, Ser. No. 724,472
Term of patent 14 years
U.S. Cl. D24—10

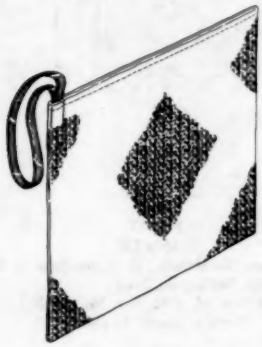
293,373
HEADSET FOR USE IN APPLYING ELECTRICAL SIGNALS TO THE TEMPLES
Stephen C. Beck, 1350 Summit Rd., Berkeley, Calif. 94708
Filed Jul. 1, 1985, Ser. No. 752,462
Term of patent 14 years
U.S. Cl. D24—17



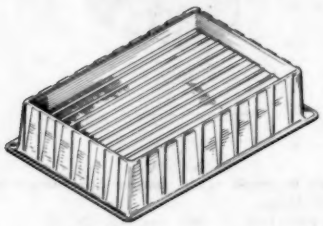
293,374
ASSAY CARDS
Max Herzberg, Moshav Sataria, and Falk Fish, Tel Aviv, both of Israel, assignors to Orgenics, Ltd., Yavne, Israel
Filed Nov. 19, 1984, Ser. No. 672,928
Term of patent 14 years
U.S. Cl. D24—17



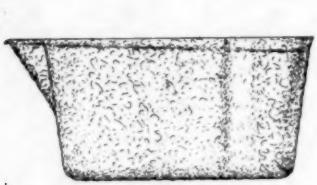
293,375
SURGICAL LAPAROTOMY PAD
Thomas Denny, East Brunswick, N.J., assignor to Johnson & Johnson Products Inc., New Brunswick, N.J.
Filed Dec. 19, 1983, Ser. No. 562,761
The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D24—34



293,376
WATER HOLDING TUB FOR SUN TANNING
James C. Blackwell, R.R. 2, Box 138, Franklin, Ind. 46131
Filed Apr. 15, 1985, Ser. No. 723,073
Term of patent 14 years
U.S. Cl. D24—39



293,377
URINE MEASURING JUG
Gilbert R. Chadbourne, Fairfield, Me., assignor to Keyes Fibre, Waterville, Me.
Filed Feb. 7, 1985, Ser. No. 699,144
Claims priority, application United Kingdom, Aug. 8, 1984, 1021403
Term of patent 14 years
U.S. Cl. D24—56



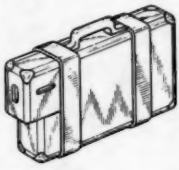
293,378
EAR CLEANER
Merrill D. Alkire, 503 Marymount Rd., #1131, Salina, Kans. 76401
Filed Jun. 12, 1985, Ser. No. 743,793
Term of patent 14 years
U.S. Cl. D24—59

293,379
FINGER SPLINT
Helmut D. Link, Hamburg, Fed. Rep. of Germany, assignor to Waldemar Link GmbH & Co., Hamburg, Fed. Rep. of Germany
Filed May 3, 1985, Ser. No. 730,715
Claims priority, application Fed. Rep. of Germany, Nov. 7, 1984, 8432615[U]; Nov. 20, 1984, 66 MRAR 2862/84
Term of patent 14 years
U.S. Cl. D24—64

293,380
VOTIVE CANDLE LAMP SHADE
Lynn H. Wells, 2260 Rushmore Dr., Marietta, Ga. 30062
Filed Jun. 19, 1985, Ser. No. 746,265
Term of patent 14 years
U.S. Cl. D26—23

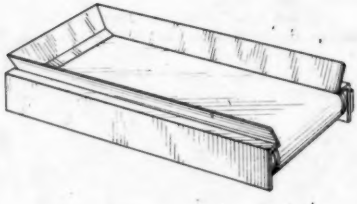
293,381
VOTIVE CANDLE LAMP SHADE
Lynn H. Wells, 2260 Rushmore Dr., Marietta, Ga. 30062
Filed Jun. 19, 1985, Ser. No. 746,264
Term of patent 14 years
U.S. Cl. D26—23

293,382
LIGHTER OR THE LIKE
Kaname Ichikawa, Tokyo, Japan, assignor to Modern Royal Co., Ltd., Tokyo, Japan
Filed Nov. 19, 1985, Ser. No. 805,757
Term of patent 14 years
U.S. Cl. D27—41



293,383
HAMPER
Rick L. Thompson, Burlington, Iowa, assignor to Burlington Basket Company, Burlington, Iowa
Filed Nov. 14, 1985, Ser. No. 805,207
Term of patent 14 years
U.S. Cl. D32—37

293,384
CONVEYOR
Paul L. Brulé, Plainwell, Mich., assignor to Ventureprise, Inc., Kalamazoo, Mich.
Filed Dec. 16, 1985, Ser. No. 809,527
Term of patent 14 years
U.S. Cl. D34—29



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TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Raymond: *See—*
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Aarestad, Jerome K.: *See—*
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Abbou, Clement: *See—*
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Abe, Michiharu: *See—*
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Abe, Takeshi, to Nissan Motor Co., Ltd. Radiator fan. 4,714,408, Cl. 416-91.000.

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Abondance, Roger; Corbet, Pierre; Jodelet, Francois; and Andre, Jean-Francois, to Skis Rossignol S.A. Cross country ski assembly. 4,714,267, Cl. 280-615.000.

Abrevaya, Hayim; and Targos, William M., to UOP Inc. Microemulsion impregnated catalyst composite and use thereof in a synthesis gas conversion process. 4,714,692, Cl. 502-261.000.

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Di Mino, Alfonso; and Di Mino, Andre, 4,714,911, Cl. 338-195.000.

Adsett, Anthony P., to International Laser Systems, Inc. Titanium heat exchanger for laser cooling. 4,714,107, Cl. 165-16.00A.

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Kong, Samuel K., 4,714,877, Cl. 324-133.000.
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Agricultural Aviation Engineering Company: *See—*
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AgRobotics, Inc.: *See—*
McEachern, Richard D.; Jordan, Willie W.; Gebheim, Gerald C.; and Robinson, Joe M., 4,714,196, Cl. 239-62.000.

Ahern, Douglas K.; Fowlkes, William Y.; and Rimai, Donald S., to Eastman Kodak Company. Electrographic reproduction apparatus. 4,714,939, Cl. 355-3.0TR.

Aichi Steel Works, Ltd.: *See—*
Honkura, Yoshinobu; Murata, Kouji; and Yokoyama, Takashi, 4,714,502, Cl. 148-307.000.

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Aikawa, Hiroshi: *See—*
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Burgoyne, William F., Jr.; and Dixon, Dale D., 4,714,778, Cl. 564-305.000.
Cabrera, Alejandro L.; Kirner, John F.; Miller, Robert A.; and Pierantozzi, Ronald, 4,714,632, Cl. 427-255.100.
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Aizawa, Shigeru: *See—*
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Akiba, Yasuhiro; Namba, Masato; Kikuchi, Seiji; and Soejima, Hidenobu, to Matsushita Electric Industrial Co., Ltd. Stepping motor. 4,714,850, Cl. 310-49.00R.

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Alas, Jacques; and Bacher, Michel, to Valeo. Progressively acting friction disk suitable for automobile vehicle clutches. 4,714,148, Cl. 192-107.00C.

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Fanti, Cristoforo; Travaglio, Gianclaudio; Ferrario, Luciano; and Moscatelli, Saverio, 4,714,127, Cl. 180-233.000.

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Chivens, Donald R.; and Greskovics, Paul, 4,714,508, Cl. 156-195.000.

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Huggins, Richard A., 4,714,432, Cl. 439-271.000.

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Boe, Richard A., 4,714,914, Cl. 340-573.000.

Auwerda, Cornelis P.; Geittner, Peter E. E.; and Lydtin, Hans-Jurgen, to U.S. Philips Corporation. Method of and device for coating the inside of tubes. 4,714,589, Cl. 427-39.000.

AVCO Everett Research Laboratory, Inc.: *See—*
Rokni, Mordechai; and Flusberg, Allen M., 4,714,902, Cl. 332-7.510.

Avedesian, Michael M., to Domtar Inc. Apparatus and method involving supercritical fluid extraction. 4,714,591, Cl. 422-140.000.

Averill, Robert G.; Khowaylo, Alex; and Sidebotham, Christopher G., to Osteonics Corp. Knee prosthesis with accommodation for angular misalignment. 4,714,472, Cl. 623-20.000.

Avery International Corporation: *See—*
Bordoloi, Binoy K.; Ozari, Yehuda; and Dever, Gerald R., 4,714,655, Cl. 428-345.000.

Axis S.p.A.: *See—*
Santandrea, Luciano; and Luciani, Sabatino, 4,713,883, Cl. 29-736.000.

Aziasekiyu Kabushiki Kaisha: *See—*
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.

B. F. Goodrich Company: *See—*
Hillstrom, David U.; and Cope, Dennis R., 4,714,220, Cl. 248-160.000.
Stevenson, Hildreth W., 4,714,637, Cl. 428-35.000.

B&G Plastics, Inc.: *See*—
Kolton, Chester; and Spater, Stuart S., 4,714,156, Cl. 206-296.000.

Baba, Saburo: *See*—
Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, 4,714,650, Cl. 428-265.000.

Baba, Takeshi: *See*—
Usui, Masayuki; Imataki, Hiroyuki; Serizawa, Takashi; Baba, Takeshi; and Nose, Hiroyasu, 4,714,326, Cl. 350-485.000.

Babcock & Wilcox Company, The: *See*—
Fidler, Fredrick H.; and Lowe, Thomas B., 4,714,072, Cl. 126-1.00F.

Bachel, Ernst; and Giebel, Wolfgang, to Siemens Aktiengesellschaft. Longitudinally divided sleeve of shrinkable material. 4,714,277, Cl. 285-39.000.

Bacher, Michel: *See*—
Alas, Jacques; and Bacher, Michel, 4,714,148, Cl. 192-107.00C.

Bachhofer, Bruno; and Locher, Anton. 5/2-Way commutating valve, particularly for reverse-flush filters. 4,714,551, Cl. 210-278.000.

Bachner, George, to Nimco Corporation. Stacking tab for tapered container. 4,714,164, Cl. 206-518.000.

Back, Sigurd; and Nyqvist, Jan-Olof, to Nobel Kemi AB. Method for the manufacture of composite explosives. 4,714,572, Cl. 264-3.400.

Bacou, Claude; Baptiste, Rene; Feissel, Henri; Takats, Gilbert; and Cabrol, Christian, to Bull S.A. (Societe Anonyme). Optoelectric transducer. 4,714,828, Cl. 250-214.00C.

Bailey, John W.; Hayter, Paul A.; Mason, Brian R.; and Turner, Graham N., to Mars, Inc. Printed circuit board fault location system. 4,714,875, Cl. 324-73.0PC.

Bajgert, Teddy A.; Bunker, Neall H.; Cochran, James L.; Duane, Willis J.; and Mojica, Arturo, to International Business Machines Corporation. Continuous form feeder for a reproducing machine and process. 4,714,946, Cl. 355-75.000.

Baka, Kathleen J.: *See*—
Kozlowski, Thomas A.; Lindstrom, Robert O.; Loughrin, Thomas D.; and Baka, Kathleen J., 4,714,181, Cl. 222-480.000.

Baker, Glen; Chau, Albert W.; and Mercer, John E., to FlowMole Corporation. Technique for steering and monitoring the orientation of a powered underground boring device. 4,714,118, Cl. 175-26.000.

Balduff, Dennis C.; and Jabarin, Saleh A., to Owens-Illinois Plastic Products Inc. Degradable polymer composition. 4,714,741, Cl. 525-185.000.

Bally Manufacturing Corporation: *See*—
Kolomayets, George; Ryan, Allen; Nieto, Augustine; and Andrus, Bryan, 4,714,244, Cl. 272-72.000.

Ban, Amir: *See*—
Paltiel, Zvi; and Ban, Amir, 4,714,885, Cl. 324-312.000.

Banbury, John R., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Display systems. 4,714,320, Cl. 350-174.000.

Bancroft, Joseph C., to Croft Metals, Inc. Hinge pin. 4,713,861, Cl. 16-222.000.

Bandera, Gianluigi, to Costruzioni Aeronautiche Giovanni Agusta S.p.A. Helicopter with a turbine power unit fitted with an exhaust screening device. 4,713,933, Cl. 60-39.500.

Banerjee, Chandra K.; Farrier, Ernest G.; Reynolds, John H., IV; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Shannon, Michael D.; and Shelar, Gary R., to R. J. Reynolds Tobacco Company. Smoking article. 4,714,082, Cl. 131-359.000.

Baptiste, Rene: *See*—
Bacou, Claude; Baptiste, Rene; Feissel, Henri; Takats, Gilbert; and Cabrol, Christian, 4,714,828, Cl. 250-214.00C.

Barbee Co., Inc., The: *See*—
Barbee, Tom D.; and Ufheil, James, 4,714,558, Cl. 210-776.000.

Barbee, Tom D.; and Ufheil, James, to Barbee Co., Inc., The. Wastewater treatment system. 4,714,558, Cl. 210-776.000.

Barber, Dennis R.; Delfs, Larry M.; and Burk, Ronnie F., to Deere & Company. Motor seal protector valve. 4,713,936, Cl. 60-403.000.

Barker, Barbara A.; and Hernandez, Irene H., to International Business Machines Corporation. Window view control. 4,714,918, Cl. 340-724.000.

Barlow, Gordon A., to Gordon Barlow Design. Anteater game. 4,714,249, Cl. 273-1.00G.

Barnett, Joseph A.; Gomez, Joseph M.; Green, William F.; Lisica, Vincent M.; and Rosenthal, Arnold B., to International Business Machines Corporation. Plural robotic drive. 4,714,400, Cl. 414-751.000.

Barrat, Christian R.: *See*—
Wevers, Jean; Barrat, Christian R.; and Hardy, Frederick E., 4,714,565, Cl. 252-174.190.

Barriquand: *See*—
Gilfaut, Jean-Pierre; Peze, Andre ; Ravillard, Jean-Paul; and Thevenet, Jean-Claude, 4,714,052, Cl. 122-149.000.

Barry, John J., to Pyramid Industries, Inc. Heat pump system. 4,714,108, Cl. 165-45.000.

Barry Wright Corporation: *See*—
Chin, Laurence D.; Hiscock, Christopher J.; and Domeier, Wayne H., 4,714,865, Cl. 318-563.000.

Bartha, Istvan V.: *See*—
Idegren, Gustav L.; Gyllstal, Lars-Goran L.; and Bartha, Istvan V., 4,714,029, Cl. 109-45.000.

Bartholomew, Roy E.: *See*—
Koening, James P.; Knight, David J.; Szudy, James E.; Bartholomew, Roy E.; and Wurst, William R., 4,714,483, Cl. 55-163.000.

Bartlett, David, to EMX International Limited. Loop data link. 4,714,925, Cl. 340-825.550.

Bartolo, William; Boillot, Louis; Challande, Rene ; De Robertis, Patrick; Duchenaud, Jacky; and Ramaciotti, Jean-Claude, to Merlin Gerin. Miniature electrical circuit breaker with multiple moving contacts and thermomagnetic trip release. 4,714,907, Cl. 335-45.000.

BASF Aktiengesellschaft: *See*—
Horn, Peter; Baumann, Edwin; and Marx, Matthias, 4,714,718, Cl. 521-134.000.
McAliley, J. Eugene; Daumit, Gene P.; Ethridge, Frederick A.; and Crozier, James R., Jr., 4,714,642, Cl. 428-113.000.
Schornick, Gunnar; Elzer, Albert; and Hofmann, Reiner, 4,714,751, Cl. 528-103.000.
Wuesi, Hans-Heiner; Janssen, Bernd; Frickel, Fritz-Frieder; and Nuerrenbach, Axel, 4,714,786, Cl. 568-633.000.

Bashford, David P.: *See*—
Denison, Samuel J. M.; and Bashford, David P., 4,714,409, Cl. 416-134.00A.

Batt, Gregory L.: *See*—
Hatton, John H.; and Batt, Gregory L., 4,714,140, Cl. 180-20.000.

Baudrant, Annie; and Marty, Michel, to Societe pour d'Etude et la Fabrication de Circuits Integres Speciaux EFCIS. Integrated circuit device which includes a continous layer which consists of conducting portions which are of a silicide of a refractory metal and insulating portions which are of an oxide of the metal. 4,714,951, Cl. 357-67.000.

Baumann, Edwin: *See*—
Horn, Peter; Baumann, Edwin; and Marx, Matthias, 4,714,718, Cl. 521-134.000.

Baus, Heinz G. Coupling assembly for joining two profiled rails. 4,714,367, Cl. 403-104.000.

Baxter Travenol Laboratories, Inc.: *See*—
Anthony, Jack; Bilstad, Arnold C.; Leblong, Wayne T.; and Kruger, Robert J., 4,714,595, Cl. 422-294.000.
Hsu, Li-Chien; and Heitzmann, Hal, 4,714,770, Cl. 556-419.000.

Bayer Aktiengesellschaft: *See*—
Bender, Wolfgang; Mrotzek, Dieter; Koglin, Bernd; and Steiner, Karl-Heinz, 4,714,456, Cl. 494-36.000.
Boden, Heinrich; and Schneider, Walter, 4,714,579, Cl. 264-328.600.
Hurnik, Helmut; Finzenhagen, Manfred; and Jeblick, Werner, 4,714,568, Cl. 252-350.000.
Morris, David B.; Rollett, Andrew C.; and Roberts, Donald M., 4,714,177, Cl. 222-58.000.
Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Dross, Joachim; and Jungverdorben, Hermann-Josef, 4,714,045, Cl. 118-420.000.
Serini, Volker; Freitag, Dieter; and Rathmann, Dietrich, 4,714,746, Cl. 525-439.000.
Stammann, Gunter; Kricsfalussy, Zoltan; Waldmann, Helmut; Schneider, Joachim; and Medem, Harald, 4,714,689, Cl. 502-54.000.

Bayer, Oswald; Grehn, Martin; and Planck, Werner, to FAG Kugelfischer Georg Schafer (KGaA). Cage for lipless roller bearings. 4,714,358, Cl. 384-470.000.

Bazeley, Graham A.: *See*—
Mather, Graham W.; Warwick, Graham R.; and Bazeley, Graham A., 4,714,268, Cl. 280-646.000.

BBC Brown, Boveri & Company, Limited: *See*—
Buhler, Karl; and Menth, Anton, 4,715,041, Cl. 373-72.000.

Beauchamp, Lilia M., to Burroughs Wellcome Co. Antiviral compounds. 4,714,701, Cl. 514-258.000.

Becherer, Johannes; Handte, Reinhardt; Nestler, Hans J.; and Kussmaul, Ulrich, to Cassella Aktiengesellschaft. Process for the preparation of 2-chlorobenzoxazoles. 4,714,766, Cl. 548-217.000.

Beck, Siegfried: *See*—
Gassmann, Heiner; Beck, Siegfried; and Heinlein, Werner, 4,714,278, Cl. 285-169.000.

Becker, Edmund H.: *See*—
Polick, Raymond L.; Tamburrino, Kenneth D.; and Becker, Edmund H., 4,714,103, Cl. 164-486.000.

Becker, Manfred: *See*—
Henklein, Peter; Becker, Manfred; Buttner, Werner; Loth, Fritz; Dautzenberg, Horts; Forner, Klaus; Dolling, Rudolf; Graul, Karl-Heinz; Halatsch, Wolf-Rainer; and Rupprich, Christian, 4,714,768, Cl. 548-435.000.

Becker, Reinhard: *See*—
Urbach, Hansjorg; Henning, Rainer; Teetz, Volker; and Becker, Reinhard, 4,714,708, Cl. 514-412.000.

Becton, Dickinson and Company: *See*—
Gabel, Jonathan B., 4,714,461, Cl. 604-53.000.

Bell, Randy L.; and Moore, George G. I., to Riker Laboratories, Inc. Antiallergic agents. 4,714,776, Cl. 562-460.000.

Bell, Robert L.; and Dillon, Joseph J., to Rappel Rescue Systems, Inc. Rappel rescue system. 4,714,135, Cl. 182-6.000.

Bell, Weldon K.; and Haag, Werner O., to Mobil Oil Corporation. Production of ethers from linear olefins. 4,714,787, Cl. 568-697.000.

Bellis, Kenneth E.; Brown, Jackson E.; and Nagarwalla, Pheroze J., to Roberts Corporation. Method and apparatus for changing a mold box on a molding machine. 4,714,100, Cl. 164-18.000.

Bender, Wolfgang; Mrotzek, Dieter; Koglin, Bernd; and Steiner, Karl-Heinz, to Bayer Aktiengesellschaft. Solid bowl centrifuge with terminal clarification device. 4,714,456, Cl. 494-36.000.

Bennett, Marc: *See*—
Berry, Craig; and Bennett, Marc, 4,714,084, Cl. 132-88.700.

Bennett, Richard. Tool for coupling sections of air conditioning ducts. 4,713,959, Cl. 72-410.000.

Bennett, Robert, to RJS Industries Inc. Dispenser of articles. 4,714,160, Cl. 206-385.000.

Bennett, Terry A.; and Carino, James E., to PPG Industries, Inc. Vacuum press construction. 4,714,489, Cl. 65-104.000.

Bennett, William R., to Gould Inc. Power module assembly of electrochemical cells. 4,714,662, Cl. 429-27.000.

Bente, H. Bryan; Herman, Alan C.; Myerson, Joel; Shaw, Benjamin G.; and Stefanski, Andrew, to Hewlett-Packard Company. Fluid proportioning pump system. 4,714,545, Cl. 210-101.000.

Benuzzi, Gino, deceased; and by Benuzzi, Piergiorgio, heir-at-law. Lifting platform for panels and method of operation thereof. 4,714,395, Cl. 414-114.000.

Benuzzi, Piergiorgio, heir-at-law: *See*—
Benuzzi, Gino, deceased; and Benuzzi, Piergiorgio, heir-at-law, 4,714,395, Cl. 414-114.000.

Berge, Cynthia A.: *See*—
Kajs, Theresa M.; and Berge, Cynthia A., 4,714,563, Cl. 252-107.000.

Bergner, Arndt, to Hilti Aktiengesellschaft. Expansion anchor assembly. 4,714,391, Cl. 411-54.000.

Bernard, Gilbert; Breden, Emile; and Lonardi, Emile. Process for controlling the charging of a shaft furnace. 4,714,396, Cl. 414-161.000.

Bernstein, Richard; Anthony, William H.; and Lupfer, David A., to K & L Microwave. SMC filter and method of manufacture thereof. 4,714,905, Cl. 333-167.000.

Berres, James: *See*—
Dusel, Robert O.; Keene, Harold J.; Berres, James; and Blaha, Gerald, 4,713,880, Cl. 29-564.400.

Berry, Craig; and Bennett, Marc. Method and apparatus for simultaneously applying and blending make-up in one step. 4,714,084, Cl. 132-88.700.

Bertram, Leo; and Schemmann, Hugo, to U.S. Philips Corporation. Single-phase synchronous motor comprising a two-pole permanent-magnet rotor. 4,714,851, Cl. 310-156.000.

Betts, Kenneth H., to Construction Specialties Limited. Panel laying machine. 4,714,393, Cl. 414-10.000.

Bianchi, Claude; Fournier, Yves; and Jacquien, Paul, to Framatome. Device for compressing by hammering a tube of a steam generator set in a tube plate. 4,713,882, Cl. 29-727.000.

BICC Public Limited Company: *See*—
Allard, Vincent L., 4,714,209, Cl. 242-25.00R.
Williams, Ronald D., 4,714,438, Cl. 439-610.000.

Biermeier, Johann; and Brand, Wilhelm, to Siemens Aktiengesellschaft. Housing for a magnetic disk memory having a disk pack seat at opposite sides of the disk pack. 4,714,972, Cl. 360-97.000.

Billings, Roger E. Funtionally structured distributed data processing system. 4,714,989, Cl. 364-200.000.

Bilstad, Arnold C.: *See*—
Anthony, Jack; Bilstad, Arnold C.; Leblong, Wayne T.; and Kruger, Robert J., 4,714,595, Cl. 422-294.000.

Binzen, Willard; and Catan, Robert S., to Dravo Corporation. Dust containment system for bulk cargo containers. 4,714,097, Cl. 141-5.000.

Bischofberger, Jurg; and Feige, Manfred, to Rieter Machine Works, Ltd. Device for transporting cans. 4,714,153, Cl. 198-457.000.

Bischoff, Gene L.; and Elly, James E., to Eastman Kodak Company. Method and apparatus for erasing a signal recorded on a magnetic disk. 4,714,969, Cl. 360-66.000.

Bizjak, John F., to Eastman Kodak Company. Binarily related variable rate recorder. 4,714,967, Cl. 360-48.000.

Blaha, Gerald: *See*—
Dusel, Robert O.; Keene, Harold J.; Berres, James; and Blaha, Gerald, 4,713,880, Cl. 29-564.400.

Blair, Ronald B., to Mobil Oil Corporation. OBC location system. 4,715,018, Cl. 367-19.000.

Blaushild, Ronald M., to United States of America, Energy. Self-adjustable supplemental support system for a cylindrical container in a housing. 4,714,228, Cl. 248-608.000.

Bleck, Norris E.: *See*—
Meeker, Gregory W.; Bleck, Norris E.; Rizzi, Marc A.; and Irick, Carl M., 4,714,422, Cl. 425-204.000.

Bloebaum, Roy D., to Harrington Arthritis Research Center. Knee prosthesis. 4,714,473, Cl. 623-20.000.

Blot, Gerard, to Essilor International Cie Generale d'Optique. Bearing ring for fixing a mounting block on the progressively variable curved finished face of a semi-finished lens or mold blank. 4,714,232, Cl. 249-90.000.

Blumenau, Leif: *See*—
Rappaport, Michael L.; and Blumenau, Leif, 4,713,945, Cl. 62-514.00R.

BMP: *See*—
Holz, Gary L.; and Foster, Walter M., 4,714,958, Cl. 358-166.000.

Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, The: *See*—
Krul, William R., 4,714,679, Cl. 435-240.480.

Board of Reagents, The University of Texas System Cancer Center, The: *See*—
Reading, Christopher L., 4,714,681, Cl. 435-240.270.

BOC Group plc, The: *See*—
Sampson, David C., 4,714,090, Cl. 137-636.000.

Bocker, Jurgen; Klein, Klaus W.; Gersbach, Klaus; Sauvestre, Jean-Claude; and Montier, Patrick, to Rheinmetall GmbH; and L'Etat Francais represente par le Delegue Ministeriel pour l'Armement. Nose for an inertial projectile. 4,714,024, Cl. 102-521.000.

Boden, Heinrich; and Schneider, Walter, to Bayer Aktiengesellschaft. Method and an apparatus for the production of shaped articles. 4,714,579, Cl. 264-328.600.

Boe, Richard A., to Automatic Safety Products. Liquid immersion alarm. 4,714,914, Cl. 340-573.000.

Boehner, Michael, to Siemens Aktiengesellschaft. Method for the simulation of an error in a logic circuit and a circuit arrangement for implementation of the method. 4,715,035, Cl. 371-23.000.

Boeing Company, The: *See*—
Mail, Jacob A., 4,714,298, Cl. 303-100.000.

Bohl, Aleck; Meyers, John; and Valdez, Leandro, to Gates Rubber Company, The. Collapsible storage and dispensing vessel. 4,714,178, Cl. 222-107.000.

Bohmler, Heinz; Daumer, Rolf; Mayer, Dieter; and Perenthaler, Egbert, to Robert Bosch GmbH. Device for determining angular position of a rotating part. 4,715,009, Cl. 364-565.000.

Bohringer, Wilfried; Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,714,412, Cl. 417-289.000.

Boillot, Louis: *See*—
Bartolo, William; Boillot, Louis; Challande, Rene ; De Robertis, Patrick; Duchenaud, Jacky; and Ramaciotti, Jean-Claude, 4,714,907, Cl. 335-45.000.

Bolden, Albert, to USEC, Inc. Method and apparatus for locating and machining an idle bypass hole in a carburetor body. 4,714,817, Cl. 219-121.0LK.

Bond, Joseph N. Bundling apparatus with flexible rope type compressor. 4,714,016, Cl. 100-212.000.

Bonkohara, Manabu: *See*—
Takekawa, Kouichi; and Bonkohara, Manabu, 4,714,952, Cl. 357-75.000.

Bono, Salvatore A. Toilet seat disenfecting device. 4,713,845, Cl. 4-233.000.

Boomgaard, Dirk J.: *See*—
Neuner, James A.; and Boomgaard, Dirk J., 4,714,926, Cl. 340-870.360.

Bordoloi, Binoy K.; Ozari, Yehuda; and Dever, Gerald R., to Avery International Corporation. Pressure-sensitive adhesive containing heat-sensitive materials, and method of making the same. 4,714,655, Cl. 428-345.000.

Born, Richard C.: *See*—
Counter, Louis F.; Born, Richard C.; Walters, LeRoy M.; Ziese, Lowell B.; and Searing, Lawrence G., 4,714,917, Cl. 340-679.000.

Borowiec, Joseph C.: *See*—
Roberts, Victor D.; and Borowiec, Joseph C., 4,714,912, Cl. 340-310.00R.

Bosco, Angelo; and Magnaghi, Edgardo, to Telefunken Robetecnica S.R.L. Pneumatic tape tensioning device for a cassette loading machine. 4,714,212, Cl. 242-182.000.

Boser, Ronald J., to Yoshida Kogyo K. K. Method for sewing zipper chain to elongated fabric pieces. 4,714,038, Cl. 112-265.200.

Bosna, Alexander A.: *See*—
Riccio, Louis M.; and Bosna, Alexander A., 4,714,623, Cl. 427-27.000.

Botti, Edoardo; and Stefani, Fabrizio, to SGS Microelettronica S.p.A. Device for protecting the final stage of a power amplifier against shorting. 4,714,898, Cl. 330-298.000.

Boudrot, John E. Loose-leaf document binder. 4,714,366, Cl. 402-13.000.

Bowers, Walter B. Piston for internal combustion engines and the like. 4,714,008, Cl. 92-219.000.

BP Chemicals Limited: *See*—
Crouzet, Pierre, 4,714,553, Cl. 210-533.000.
Tenhagen, Rudolf J., 4,714,574, Cl. 264-45.100.

Bradley, Danny R.: *See*—
Morrison, Elbert F.; Bradley, Danny R.; and Reece, D. C., 4,713,931, Cl. 57-328.000.

Bradshaw, Thomas I.; Orensteen, Bruce D.; and Cook, Jack E., to Minnesota Mining and Manufacturing Company. Sheet containing contour-dependent directional image and method for forming the same. 4,714,656, Cl. 428-411.100.

Brady, John K.: *See*—
True, Charles W., III; and Brady, John K., 4,715,046, Cl. 375-61.000.

Brammer, Norman, to Vetco Gray Inc. Weight/pressure set pack-off for subsea wellhead systems. 4,714,111, Cl. 166-182.000.

Brand, Jerry C., to Motorola, Inc. Dielectric resonator directional filter. 4,714,903, Cl. 333-110.000.

Brand, Wilhelm: *See*—
Biermeier, Johann; and Brand, Wilhelm, 4,714,972, Cl. 360-97.000.

Branstetter, Ronald L.: *See*—
Edgar, Reuben W., Jr.; Gilstad, Dennis W.; and Branstetter, Ronald L., 4,714,080, Cl. 128-633.000.

Braun, Anton J. Piccolo flute. 4,714,000, Cl. 84-384.000.

Braun, Walter; Kersten, Reinhard; and Kuhl, Egbert, to U.S. Philips Corporation. Cooker with means for automatically controlling the heating of a pan with food material. 4,714,822, Cl. 219-449.000.

Breakthru Industries, Inc.: *See*—
Appleton, Gregory H.; and Mikelk, Paul D., 4,714,122, Cl. 177-139.000.

Breden, Emile: *See*—
Bernard, Gilbert; Breden, Emile; and Lonardi, Emile, 4,714,396, Cl. 414-161.000.

Bresin, Mark S.: *See*—
Marabotto, Eduardo J.; Bresin, Mark S.; and Drake, Bick R., 4,714,439, Cl. 439-627.000.

Bridgestone Corp.: *See*—
Hashimoto, Takatsugu; Maehara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, 4,714,734, Cl. 524-496.000.
Hoshino, Takashi, 4,714,732, Cl. 524-474.000.

Bridgwater, Jon D.: *See*—
Flaherty, Patrick; and Bridgwater, Jon D., 4,713,850, Cl. 4-585.000.
Briggs, Paul C.; and Gosiewski, Donald E., to Illinois Tool Works Inc. Acid modified adhesive compositions. 4,714,730, Cl. 524-321.000.
Briner, Michael S.: *See*—
Jain, Babu L.; Jain, Pardeep K.; and Briner, Michael S., 4,714,901, Cl. 331-176.000.
Bristol-Myers Company: *See*—
Brundidge, Steven P.; Brodfuehrer, Paul R.; Sapino, Chet, Jr.; Shih, Kun M.; and Walker, Donald G., 4,714,760, Cl. 540-222.000.
British Aerospace PLC: *See*—
Jupp, Jeffrey A.; and Rees, Peter H., 4,714,215, Cl. 244-199.000.
British Aerospace Public Limited Company: *See*—
Meston, Spencer D.; and Phillips, John W., 4,714,216, Cl. 244-3.290.
British-American Tobacco Company Limited: *See*—
Luke, John A., 4,714,083, Cl. 131-94.000.
Brittan, John L. Grade averaging calculator. 4,715,011, Cl. 364-734.000.
Brodfuehrer, Paul R.: *See*—
Brundidge, Steven P.; Brodfuehrer, Paul R.; Sapino, Chet, Jr.; Shih, Kun M.; and Walker, Donald G., 4,714,760, Cl. 540-222.000.
Broemer, Heinz: *See*—
Franek, Henning; Broemer, Heinz; Deutscher, Klaus, deceased; and Schaefer, Roland, 4,714,721, Cl. 523-113.000.
Brogardh, Torgny; Hok, Bertil; and Ovren, Christer, to ASEA Aktiebolag. Optical position-measuring sensor. 4,714,835, Cl. 250-486.100.
Brolin, Charles A., to FMC Corporation. Induction heating pressure welding with linear bus bar joint. 4,714,808, Cl. 219-9.500.
Brooks, John G., Jr.; and Spires, Walter P., Jr., to Dow Corning Wright Corporation. Tibial knee joint prosthesis with removable articulating surface insert. 4,714,474, Cl. 623-20.000.
Brooks, Raymond E., Jr., to Hardwood Lighting Designs Corp. Ceiling dome. 4,713,916, Cl. 52-39.000.
Broselow, James B. Measuring tape for directly determining physical treatment and physiological values. 4,713,888, Cl. 33-137.00R.
Brother Kogyo Kabushiki Kaisha: *See*—
Sakakibara, Kenji; Akao, Michitoshi; Hayashi, Shigeyuki; and Sakai, Jun, 4,714,943, Cl. 355-27.000.
Shimada, Masami, 4,714,039, Cl. 112-275.000.
Yamakawa, Kiyoshi; and Yoshimoto, Satoshi, 4,714,361, Cl. 400-144.200.
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Brown, Ian G.; and Galvin, James. Ion beam generating apparatus. 4,714,860, Cl. 315-111.810.
Brown, Jackson E.: *See*—
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Brown, John E. Non-toxic shot. 4,714,023, Cl. 102-516.000.
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Rahier, Andre ; Cornelissen, Rene D. W.; and Bruggeman, Aime , 4,714,533, Cl. 204-262.000.
Brugger, Rudolf: *See*—
Goldmann, Horst; Einsle, Guenter; Brugger, Rudolf; and Wacker, Josef, 4,713,866, Cl. 29-33.00K.
Brundidge, Steven P.; Brodfuehrer, Paul R.; Sapino, Chet, Jr.; Shih, Kun M.; and Walker, Donald G., to Bristol-Myers Company. Cephalosporin intermediates. 4,714,760, Cl. 540-222.000.
Brunner, Travis J. Downhole safety valve operable by differential pressure. 4,714,116, Cl. 166-321.000.
Brunswick Corporation: *See*—
Staerzl, Richard E., 4,714,067, Cl. 123-494.000.
Bruzzone, Mario; Gordini, Silvano; and Wyllie, Ken, to Enichem Elastomeri S.p.A. Manufacture of butyl rubber. 4,714,747, Cl. 526-64.000.
Buckle, Ian G.; and Michael, John P., to DFC New Zealand Limited. Frictional energy absorbing device and/or methods of absorbing energy. 4,713,917, Cl. 52-167.000.
Buckmaster, Marlin D., to Du Pont de Nemours, E. I., and Company. Process for preparing melt processible tetrafluoroethylene copolymer granules. 4,714,756, Cl. 528-481.000.
Buford, John T., to Sundstrand Corporation. Power source utilizing encapsulated lithium pellets and method of making such pellets. 4,714,051, Cl. 122-21.000.
Buhler, Karl; and Menth, Anton, to BBC Brown, Boveri & Company, Limited. Bath electrode for pot furnace. 4,715,041, Cl. 373-72.000.
Bull S.A. (Societe Anonyme): *See*—
Bacou, Claude; Baptiste, Rene; Feissel, Henri; Takats, Gilbert; and Cabrol, Christian, 4,714,828, Cl. 250-214.00C.
Bull, Timothy B. H.; and Wahl, Raymond C., to Loram Maintenance of Way, Inc. Railroad mounted trench digger. 4,713,898, Cl. 37-96.000.
Buller, Marvin L.; Lumbra, Douglas L.; Phelps, Douglas W.; Samuelsen, Sigvart J.; and Ward, William C., to International Business Machines Corporation. Welded wire cooling. 4,714,953, Cl. 357-81.000.
Bulso, Joseph D., Jr.; and McClung, James A., to Redicon Corporation. Method and apparatus for forming container end panels. 4,713,958, Cl. 72-348.000.
Bulten-Kanthal AB: *See*—
Lindgren, Hakan; and Anderson, Bjorn, 4,714,659, Cl. 428-685.000.
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, to Toyota Jidosha Kabushiki Kaisha. Suspension controller. 4,714,271, Cl. 280-707.000.
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Bunick, Frank J.; Hutchinson, Sheryl A.; and Cifrese, Ralph, to Warner-Lambert Company. Soft, sugarless aerated confectionery composition. 4,714,620, Cl. 426-572.000.
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Baigert, Teddy A.; Bunker, Neall H.; Cochran, James L.; Duane, Willis J.; and Mojica, Arturo, 4,714,946, Cl. 355-75.000.
Bunker, William M.; and Merz, Donald M., to General Electric Company. Method of comprehensive distortion correction for a computer image generation system. 4,714,428, Cl. 434-43.000.
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Nidiffer, Charles A.; and Van Camp, Raymond E., 4,714,206, Cl. 241-100.000.
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Chopra, Kasturi L.; Bunshah, Roitan F.; Deshpandey, Chandra V.; and Vankar, Vasant D., 4,714,625, Cl. 427-35.000.
Burbank, John E., III: *See*—
Fernandes, Roosevelt A.; Smith-Vaniz, William R.; Burbank, John E., III; and Sieron, Richard L., 4,714,893, Cl. 324-126.000.
Burckhalter, Joseph H. Method of inhibiting herpetic lesions. 4,714,703, Cl. 514-274.000.
Burgoyne, William F., Jr.; and Dixon, Dale D., to Air Products and Chemicals, Inc. Alkenylated toluenediamines for use in preparing polyurethane/urea systems. 4,714,778, Cl. 564-305.000.
Burk, Ronnie F.: *See*—
Barber, Dennis R.; Delfs, Larry M.; and Burk, Ronnie F., 4,713,936, Cl. 60-403.000.
Burlington Industries, Inc.: *See*—
Morrison, Elbert F.; Bradley, Danny R.; and Reece, D. C., 4,713,931, Cl. 57-328.000.
Burri, Caius: *See*—
Comte, Pierre-Andre; Burri, Caius; Claes, Lutz; Gerngross, Heinz; and Meier, Remy, 4,714,076, Cl. 128-92.0ZW.
Burroughs Wellcome Co.: *See*—
Beauchamp, Lilia M., 4,714,701, Cl. 514-258.000.
Burstein, Albert H.: *See*—
Ranawat, Chitranjan S.; Straub, Lee R.; Inglis, Allan E.; and Burstein, Albert H., 4,714,476, Cl. 623-21.000.
Burt, Edward A.: *See*—
Goins, Dixie E.; Holmes, Silas W.; and Burt, Edward A., 4,714,691, Cl. 502-152.000.
Burt, Raymond J. Dual harmonica arrays and harmonica receptacles. 4,713,999, Cl. 84-379.000.
Busak + Luyken GmbH & Co.: *See*—
Mack, Theo; and Edlund, Roy, 4,714,259, Cl. 277-165.000.
Buschmann, Gerd: *See*—
Thies, Peter W.; David, Samuel; Kuehl, Ulrich; Buschmann, Gerd; and Flecker, Peter, 4,714,709, Cl. 514-414.000.
Bushell, Michael J., to Imperial Chemical Industries PLC. Fluoro alcohols and insecticidal esters thereof. 4,714,790, Cl. 568-807.000.
Bussey, Stephen; Cockburn, Barry; and Heath, Alastair E. F., to Leslie Hartridge Limited. Fuel injection system monitoring equipment. 4,714,998, Cl. 364-431.010.
Butterweck, Helgard: *See*—
Hoke, Engelbert; and Butterweck, Helgard, 4,714,548, Cl. 210-221.200.
Buttner, Werner: *See*—
Henklein, Peter; Becker, Manfred; Buttner, Werner; Loth, Fritz; Dautzenberg, Horts; Forner, Klaus; Dolling, Rudolf; Graul, Karl-Heinz; Halatsch, Wolf-Rainer; and Rupprich, Christian, 4,714,768, Cl. 548-435.000.
Buyan, Frank M.; and Ross, Mark S., to Mobil Oil Corporation. Method and apparatus for improving cyclone efficiency. 4,714,541, Cl. 208-161.000.
bv Optische Industrie"De Oude Delft": *See*—
Vlasbloem, Hugo; and Duinker, Simon, 4,715,056, Cl. 378-152.000.
Byrnes, Francis E.; Ferris, Donald L.; Hibyan, Edward S.; Noehren, William L.; and Ogle, Peter C., to United Technologies Corporation. Elastomeric high torque, constant velocity joint. 4,714,450, Cl. 464-90.000.
C.C. Developments, Limited: *See*—
Edwards, William, 4,714,649, Cl. 428-257.000.
Cable Electric Products, Inc.: *See*—
Schwartz, Frederic W., 4,713,874, Cl. 29-566.400.
Cabrera, Alejandro L.; Kirner, John F.; Miller, Robert A.; and Pierantozzi, Ronald, to Air Products and Chemicals, Inc. Method of producing silicon diffusion coatings on metal articles. 4,714,632, Cl. 427-255.100.
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Bacou, Claude; Baptiste, Rene; Feissel, Henri; Takats, Gilbert; and Cabrol, Christian, 4,714,828, Cl. 250-214.00C.
Cadet Manufacturing Company: *See*—
Eckman, Harold J., 4,714,194, Cl. 237-70.000.
Cagle, Larry L.; Andersen, Keith D.; and Lurvey, Victor E., to Fibercast Company. Molding of integral socket connection in centrifugally cast fiberglass reinforced pipe. 4,714,578, Cl. 264-255.000.
Calderon, Reynaldo. Methods and systems for retrograde perfusion in the body for curing it of the disease or immume deficiency. 4,714,460, Cl. 604-28.000.

Callahan, James L.: *See*—
Paparizos, Christos; Shaw, Wilfrid G.; and Callahan, James L., 4,714,695, Cl. 502-339.000.

Calloway, Danny L. Board game simulating educational methods involving school or college curriculums. 4,714,254, Cl. 273-249.000.

Calloway, Luther, Jr.; and Spector, George. Bowl emblems. 4,713,900, Cl. 40-324.000.

Calmes, Bobbie G. Collapsible easel for artists. 4,714,224, Cl. 248-465.000.

Camara, Michael A.: *See*—
Steltenkamp, Robert J.; and Camara, Michael A., 4,714,559, Cl. 252-8.800.

Cambelt International Corporation: *See*—
Campbell, Colin D.; and Campbell, David R., 4,714,151, Cl. 198-860.500.

Camoga S.p.A.: *See*—
Mascetti, Paolo, 4,713,950, Cl. 69-10.000.

Campbell, Colin D.; and Campbell, David R., to Cambelt International Corporation. Apparatus for supporting and enclosing conveyor systems. 4,714,151, Cl. 198-860.500.

Campbell, David R.: *See*—
Campbell, Colin D.; and Campbell, David R., 4,714,151, Cl. 198-860.500.

Campbell, Henry F.: *See*—
Kuhla, Donald E.; Studt, William L.; Campbell, Henry F.; and Yelnosky, John, 4,714,707, Cl. 514-361.000.

Canada, Her Majesty the Queen in right of: *See*—
Silverthorn, Gideon C., 4,714,486, Cl. 55-316.000.

Canadian Patents And Development Limited: *See*—
Masamura, Tatsuro, 4,715,048, Cl. 375-100.000.

Canaud, Alain: *See*—
Raisin, Jean-Pierre; and Canaud, Alain, 4,714,036, Cl. 112-147.000.

Canon Kabushiki Kaisha: *See*—
Edakubo, Hiroo, 4,714,970, Cl. 360-73.000.
Eguchi, Masaharu; Tosaka, Yoichi; Ohnuki, Ichiro; Aihara, Yoshihiko; and Ishizaki, Akira, 4,714,332, Cl. 354-21.000.
Inoue, Yutaka; Kurata, Mitsuru; Kasama, Nobuhiro; Hosaka, Masao; Yagasaki, Toshiaki; Tanioka, Hiroshi; and Yamakawa, Tadashi, 4,714,940, Cl. 355-3.00R.
Ishizuka, Keiji, 4,714,892, Cl. 329-50.000.
Kanno, Hideo; Yamashita, Shinichi; Enari, Masahiko; Kuno, Mitsutoshi; and Mizutome, Atsushi, 4,714,921, Cl. 340-784.000.
Katagiri, Kazuharu; Yoshinaga, Kazuo; Okada, Shinjiro; and Kanbe, Junichiro, 4,714,323, Cl. 350-350.00S.
Muto, Kazuhiko, 4,714,844, Cl. 307-494.000.
Nagata, Satoshi, 4,715,006, Cl. 364-523.000.
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,714,337, Cl. 355-3.0DR.
Oda, Kazuyuki; Yui, Yoshikiyo; Kataoka, Yoshiharu; and Hata, Hideo, 4,714,331, Cl. 353-122.000.
Saito, Syuichiro; and Okino, Tadashi, 4,714,966, Cl. 358-335.000.
Sasaki, Takashi, 4,714,964, Cl. 358-298.000.
Sawamura, Mitsuharu; and Taniguchi, Yasushi, 4,714,308, Cl. 350-1.700.
Tamamura, Hideo; and Maeno, Hiroshi, 4,714,333, Cl. 354-64.000.
Usui, Masayuki; Imataki, Hiroyuki; Serizawa, Takashi; Baba, Takeshi; and Nose, Hiroyasu, 4,714,326, Cl. 350-485.000.
Yamamoto, Mitsuru; Sakurada, Nobuaki; and Watanabe, Yoshitaka, 4,714,935, Cl. 346-140.00R.
Yokono, Koujiro; Kamio, Masaru; and Ohkubo, Yukitoshi, 4,714,636, Cl. 428-1.000.

Canzutti, Roberto: *See*—
Poloni, Alfredo; Drigani, Fausto; and Canzutti, Roberto, 4,714,355, Cl. 384-193.000.

Carden, Anthony A., to Stanley, Laverne. Skin tanning composition. 4,714,609, Cl. 424-59.000.

Carino, James E.: *See*—
Bennett, Terry A.; and Carino, James E., 4,714,489, Cl. 65-104.000.

Carl Freudenberg, Firma: *See*—
Hartmann, Ludwig; and Ruzek, Ivo, 4,714,651, Cl. 428-286.000.

Carl-Zeiss-Stiftung: *See*—
Spruck, Bernd; and Gerber, Siegfried, deceased, 4,714,823, Cl. 250-205.000.

Carl-Zeiss-Stiftung, Heidenhime/Brenz: *See*—
Strauss, Bernhard, 4,713,892, Cl. 33-559.000.

Carlson, Glenn R., to Rohm and Haas Company. Certain 2-phenyl-4-oxo-nicotinates and their use for inducing male sterility in a cereal grain plant. 4,714,492, Cl. 71-94.000.

Carossio, Guido: *See*—
Guglielmetti, Giorgio; Carossio, Guido; and Gilli, Luigi, 4,713,994, Cl. 83-71.000.

Carr, Christopher; and Rembold, William T., to Procter & Gamble Company, The. Method and apparatus for applying adhesive to the edges of open container ends. 4,714,630, Cl. 427-207.100.

Carroll, Ronnie D.; and Volkmann, Robert A., to Pfizer Inc. 6,6-dihalopenicillanic acid 1,1-dioxides and process. 4,714,761, Cl. 540-310.000.

Cascade Corporation: *See*—
Olson, John E., 4,714,399, Cl. 414-621.000.

Cascajosa, Felix G., to Latimer N.V. Method and device for supplying fuel and air to an internal combustion engine. 4,714,065, Cl. 123-452.000.

Casio Computer Co., Ltd.: *See*—
Hara, Kazuya, 4,714,980, Cl. 361-395.000.

Cassat, Robert, to Rhone-Poulenc Recherches. Metallizable substrate composites and printed circuits produced therefrom. 4,714,653, Cl. 428-328.000.

Cassella Aktiengesellschaft: *See*—
Becherer, Johannes; Handte, Reinhardt; Nestler, Hans J.; and Kussmaul, Ulrich, 4,714,766, Cl. 548-217.000.

Catan, Robert S.: *See*—
Binzen, Willard; and Catan, Robert S., 4,714,097, Cl. 141-5.000.

Catchpole, Clive: *See*—
Kitamura, Koichi; Swartz, Louis D.; Catchpole, Clive; and Yaniv, Zvi, 4,714,836, Cl. 250-578.000.

Cawrey, Philip G. Pegboard bracket retainer. 4,714,221, Cl. 248-221.100.

Cayton, Nancy M., to Educational Experiences, Inc. Column marker. 4,713,891, Cl. 33-494.000.

CBI Industries, Inc.: *See*—
Coers, Don H., 4,714,175, Cl. 220-216.000.

Cecil, Don R.; and Evans, Richard P., to Pacefault Limited. Apparatus for use in cleaning the tape of a tape cassette. 4,713,857, Cl. 15-97.00R.

Cefin S.p.A.: *See*—
Pazzaglia, Luigi, 4,714,816, Cl. 219-109.000.

Centre National de la Recherche Scientifique: *See*—
Kergomard, Jean; and Meynial, Xavier, 4,714,001, Cl. 84-386.000.
Rey, Pierre; Abbou, Clement; Leandri, Jacqueline; and Sezeur, Alain J. P. R., 4,714,074, Cl. 128-1.100.

Cescon, Lawrence A.; Trebilcock, Robert W.; and Moffett, Robert H., to Du Pont de Nemours, E. I., and Company. Emulsion-containing explosive compositions. 4,714,503, Cl. 149-21.000.

Chakrabarti, Paritosh M.: *See*—
Mohnot, Shantilal M.; and Chakrabarti, Paritosh M., 4,714,113, Cl. 166-270.000.

Challande, Rene : *See*—
Bartolo, William; Boillot, Louis; Challande, Rene ; De Robertis, Patrick; Duchenaud, Jacky; and Ramaciotti, Jean-Claude, 4,714,907, Cl. 335-45.000.

Chang, Shih-Ming: *See*—
Kabasawa, Satoshi; Hsieh, Ming-Shiun; Chang, Shih-Ming; and Lin, Chun-Hong, 4,715,004, Cl. 364-513.500.

Chang, Wen H.; Prucnal, Paul J.; Peffer, John R.; Dufford, Edward L.; and Ambrose, Ronald R., to PPG Industries, Inc. Acrylic polymers containing hydrolyzable moieties from organosilane compounds. 4,714,738, Cl. 525-58.000.

Chaplin, John B.; and Whipple, Charles S., to Textron Inc. Flexible exhaust duct. 4,714,443, Cl. 440-89.000.

Chapman, Carroll W.; and Angehrn, Jorg A., to Chevron Research Company. Method of interpreting impedance distribution of an earth formation using precursor logging data provided by a multi-electrode logging array stationary within a borehole. 4,714,889, Cl. 324-366.000.

Charmet, Paul, to Commissariat a l'Energie Atomiques. Wide frequency pass band magnetic field detector. 4,714,880, Cl. 324-258.000.

Chau, Albert W.: *See*—
Baker, Glen; Chau, Albert W.; and Mercer, John E., 4,714,118, Cl. 175-26.000.

Chaudhari, Praveen: *See*—
Clark, Gregory J.; Chaudhari, Praveen; Cuomo, Jerome J.; Frisch, Margaret A.; and Speidell, James L., 4,714,831, Cl. 250-305.000.

Chaumesu, Alain; Crotet, Eric; Kerdraon, Alain; and Ragonnet, Jean-Paul, to Etat Francais. Warhead with tandem shaped charges. 4,714,022, Cl. 102-476.000.

Chen, Geng-Nong. Commodity shelf adaptors. 4,714,370, Cl. 403-217.000.

Chen, Peter J., to United States of America, Energy. Electrically induced mechanical precompression of ferroelectric plates. 4,714,848, Cl. 310-359.000.

Chen, Sun C., to Turn-Luckily Intl., Ltd.; and Hozn Auto & Soft Co., Ltd. Selective switch. 4,714,805, Cl. 200-16.00A.

Chesebrough-Pond's, Inc.: *See*—
Engle, Elbert, 4,714,035, Cl. 112-114.000.

Chevron Research Company: *See*—
Chapman, Carroll W.; and Angehrn, Jorg A., 4,714,889, Cl. 324-366.000.
Nigrini, Andrew; and Hsueh, Liming, 4,714,112, Cl. 166-252.000.

Chiarizzio, Samuel J.: *See*—
Fichera, Alfred J.; and Chiarizzio, Samuel J., 4,714,477, Cl. 623-22.000.

Chikasue, Hideo, to Yazaki Corporation. Cross-coil type indicating instrument. 4,715,043, Cl. 374-184.000.

Chimowitz, Eldred: *See*—
Pennisi, Kenneth; and Chimowitz, Eldred, 4,714,526, Cl. 203-49.000.

Chin, Aland K.: *See*—
Satyanarayan, Arumugam; and Chin, Aland K., 4,714,518, Cl. 156-635.000.

Chin, Laurence D.; Hiscock, Christopher J.; and Domeier, Wayne H., to Barry Wright Corporation. Overload protection device. 4,714,865, Cl. 318-563.000.

Chivens, Donald R.; and Greskovics, Paul, to Alopex Industries, Inc. Fixture and method for making spiral wound hose. 4,714,508, Cl. 156-195.000.

Cho, Myung H. Pivotal skipping rope handles having spring resistance. 4,714,245, Cl. 272-75.000.

Choay, Patrick: *See*—
Fournier, Jean-Paul; and Choay, Patrick, 4,714,700, Cl. 514-229.000.

Choay S.A.: *See*—
Fournier, Jean-Paul; and Choay, Patrick, 4,714,700, Cl. 514-229.000.
Chopra, Kasturi L.; Bunshah, Roitan F.; Deshpandey, Chandra V.; and Vankar, Vasant D. Deposition of films of cubic boron nitride and nitrides of other group III elements. 4,714,625, Cl. 427-35.000.
Chou, Hung-Chang. Building safety rescue device. 4,714,137, Cl. 182-193.000.
Christy, Mark R.; and Ecker, Ernest L., to Dow Chemical Company, The. Ultraviolet light-stable ignition resistant thermoplastic molding compositions. 4,714,729, Cl. 524-281.000.
Chrysler Motors Corporation: *See*—
Keenan, Daniel J.; and Hoss, Donald A., 4,714,169, Cl. 220-8.000.
Chuang, Jo-Yu: *See*—
Hebert, Joel J.; and Chuang, Jo-Yu, 4,714,119, Cl. 175-20.000.
Chung, Shine C., to Advanced Micro Devices, Inc. Control circuit for disabling or enabling the provision of redundancy. 4,714,839, Cl. 307-441.000.
Ciba-Geigy Corporation: *See*—
Pfeifer, Josef; and Duthaler, Rudolf, 4,714,669, Cl. 430-325.000.
Cifrese, Ralph: *See*—
Bunick, Frank J.; Hutchinson, Sheryl A.; and Cifrese, Ralph, 4,714,620, Cl. 426-572.000.
Cioffi, Victor E., to Nabisco Brands, Inc. Modular wall system. 4,713,918, Cl. 52-221.000.
Civin, Curt I., to Johns Hopkins University, The. Human stem cells. 4,714,680, Cl. 435-240.250.
Claes, Lutz: *See*—
Comte, Pierre-Andre; Burri, Caius; Claes, Lutz; Gerngross, Heinz; and Meier, Remy, 4,714,076, Cl. 128-92.0ZW.
Claessen, Albertus M. G., to NCR Corporation. Adaptive hybrid circuit. 4,715,064, Cl. 379-392.000.
Clairol Incorporated: *See*—
Morrison, Herbert M.; and Del Mar, Jorge, 4,714,820, Cl. 219-222.000.
Clark, Gregory J.; Chaudhari, Praveen; Cuomo, Jerome J.; Frisch, Margaret A.; and Speidell, James L., to International Business Machines. Spherical retarding grid analyzer. 4,714,831, Cl. 250-305.000.
Clark, Michael J., to M-O Valve Company Limited, The. Magnetrons. 4,714,859, Cl. 315-39.670.
Clausen, Eivind, to Allsop, Inc. Apparatus for cleaning digital audio discs. 4,713,856, Cl. 15-97.00R.
Cleland, Terry P. Percussion musical instrument drum-head skin tensioning assembly and drum shell construction therefor. 4,714,002, Cl. 84-413.000.
CM & E/California, Inc.: *See*—
Smart, W. James, 4,714,010, Cl. 98-115.400.
Cochran, James L.: *See*—
Bajgert, Teddy A.; Bunker, Neall H.; Cochran, James L.; Duane, Willis J.; and Mojica, Arturo, 4,714,946, Cl. 355-75.000.
Cockburn, Barry: *See*—
Bussey, Stephen; Cockburn, Barry; and Heath, Alastair E. F., 4,714,998, Cl. 364-431.010.
Coers, Don H., to CBI Industries, Inc. Tank liquid interface separation deck with leveling lines. 4,714,175, Cl. 220-216.000.
Cohen, Robert K. Quadrature phase signal processor. 4,714,913, Cl. 340-347.00P.
Cole, David M., to Tread Corporation. Security cabinet with disguised electronic control panel. 4,714,030, Cl. 109-61.000.
Cole, Martin T. Optical smoke detectors. 4,714,347, Cl. 356-339.000.
Coleman, James A., to Xerox Corporation. Power supply for a.c. corotrons. 4,714,978, Cl. 361-235.000.
Coleman, Kevin G.: *See*—
Lipscher, Bernard N.; and Coleman, Kevin G., 4,715,060, Cl. 379-70.000.
Colgate-Palmolive Company: *See*—
Steltenkamp, Robert J.; and Camara, Michael A., 4,714,559, Cl. 252-8.800.
Colite Industries, Inc.: *See*—
Witt, Frank A., 4,714,581, Cl. 264-553.000.
Collin, Andre , to Solvay & Cie (Societe Anonyme). Brominated polyetherpolyols, process for their preparation and the use of brominated polyetherpolyols in the manufacture of rigid polyurethane foams. 4,714,720, Cl. 521-171.000.
Collins, William K.; and Spector, George. Comfort ring. 4,713,947, Cl. 66-1.00A.
Colman, Bernard. Adjustable mold for the manufacture of concrete elements such as staircases. 4,714,231, Cl. 249-14.000.
Colombani, Antoine: *See*—
D'Albaret, Bertrand; and Colombani, Antoine, 4,714,906, Cl. 333-202.000.
Colony Services Inc.: *See*—
Smith, Robert W., 4,713,929, Cl. 56-8.000.
Colorado State University: *See*—
Scher, Frances M., 4,714,614, Cl. 424-93.000.
Colt Industries Operating Corp.: *See*—
Corrette, Richard H., 4,713,954, Cl. 72-88.000.
Columbia University, Trustees of: *See*—
Manning, Maurice; and Sawyer, Wilbur H., 4,714,696, Cl. 514-11.000.
Colvin, Howard A.; Cottman, Kirkwood S.; and Parker, Dane K., to Goodyear Tire & Rubber Company, The. Functionalized monomers from 1-(1-isocyanato-1-methylethyl)-3 or 4-(1-methylethenyl) benzene. 4,714,772, Cl. 558-240.000.
Colwell, Terance C.: *See*—
Coombes, Robert L., Jr.; Owen, Merrill J.; Colwell, Terance C.; and Walker, Donald E., 4,714,535, Cl. 204-297.00W.
Combustion Engineering, Inc.: *See*—
Shulof, George F.; and DiMonte, Michael J., 4,714,202, Cl. 241-30.000.
Commercial Aluminum Cookware Company: *See*—
Hann, William L.; and Fuller, Stanley E., 4,714,166, Cl. 211-113.000.
Commins, Alfred D., to Simpson Strong-Tie Company, Inc. Hurricane tie. 4,714,372, Cl. 403-400.000.
Commissariat a l'Energie Atomique: *See*—
Eloy, Jean-Francois, 4,714,628, Cl. 427-53.100.
Giroud, Anne-Marie, 4,714,775, Cl. 560-194.000.
Commissariat a l'Energie Atomiques: *See*—
Charmet, Paul, 4,714,880, Cl. 324-258.000.
Compagnie D'electronique et de Piezo-electricite: *See*—
D'Albaret, Bertrand; and Colombani, Antoine, 4,714,906, Cl. 333-202.000.
Comstock, Robert J.; and Sabol, George P., to Westinghouse Electric Corp. Method for monitoring the crystallographic texture of metallic tubes by use of X-ray diffraction. 4,715,053, Cl. 378-73.000.
Comte, Pierre-Andre; Burri, Caius; Claes, Lutz; Gerngross, Heinz; and Meier, Remy, to Synthes. Device for the setting of bone segments. 4,714,076, Cl. 128-92.0ZW.
Conoco Inc.: *See*—
Oates, Danny R., 4,714,233, Cl. 251-14.000.
Consolidation Coal Co.: *See*—
Webb, Frederick A., 4,713,893, Cl. 34-25.000.
Construction Specialties Limited: *See*—
Betts, Kenneth H., 4,714,393, Cl. 414-10.000.
Contitronix Inc.: *See*—
Shrime, George, 4,714,362, Cl. 400-144.200.
Cook, Charles. Rear view mirror with day/night setting and adjustable panoramic view. 4,714,322, Cl. 350-281.000.
Cook, David C., to Cook, Thomas O., a part interest. Ball bat. 4,714,251, Cl. 273-72.00R.
Cook, Jack E.: *See*—
Bradshaw, Thomas I.; Orensteen, Bruce D.; and Cook, Jack E., 4,714,656, Cl. 428-411.100.
Cook, Kenneth: *See*—
Eichen, Elliot; Melman, Paul; and Cook, Kenneth, 4,714,346, Cl. 356-349.000.
Cook, Thomas O.: *See*—
Cook, David C., 4,714,251, Cl. 273-72.00R.
Coombes, Robert L., Jr.; Owen, Merrill J.; Colwell, Terance C.; and Walker, Donald E., to Crown City Plating Co. Molded framework for electroless and electrolytic plating racks. 4,714,535, Cl. 204-297.00W.
Cooper-Hart, Michael A.; Emmons, Lawrence D.; Mackley, James S.; and Stokes, David H., to Luma Telecom, Inc. Conversational video phone. 4,715,059, Cl. 379-53.000.
Copal Company Limited: *See*—
Suzuki, Akira, 4,714,336, Cl. 354-246.000.
Cope, Dennis R.: *See*—
Hillstrom, David U.; and Cope, Dennis R., 4,714,220, Cl. 248-160.000.
Corbet, Pierre: *See*—
Abondance, Roger; Corbet, Pierre; Jodelet, Francois; and Andre, Jean-Francois, 4,714,267, Cl. 280-615.000.
Corbitt, Newsome E., III. Bait guard for a fish hook. 4,713,908, Cl. 43-43.400.
Cordis Corporation: *See*—
Hooven, Michael D., 4,714,458, Cl. 604-9.000.
Hooven, Michael D., 4,714,459, Cl. 604-9.000.
Cordts, Bernhard F., to Varian Associates, Inc. Ferromagnetic films for high density recording and methods of production. 4,714,641, Cl. 428-610.000.
Corke, Michael: *See*—
Jackson, David A.; Corke, Michael; and Kersey, Alan D., 4,714,342, Cl. 356-44.000.
Corman, Ned E., to AMP Incorporated. Electrical socket. 4,714,441, Cl. 439-842.000.
Cornelissen, Rene D. W.: *See*—
Rahier, Andre ; Cornelissen, Rene D. W.; and Bruggeman, Aime , 4,714,533, Cl. 204-262.000.
Corning Glass Works: *See*—
Adler, Meryle D. W., 4,713,913, Cl. 51-165.900.
Holleran, Louis M.; and Martin, Francis W., 4,714,687, Cl. 501-9.000.
Powers, Dale R., 4,714,488, Cl. 65-13.000.
Corrette, Richard H., to Colt Industries Operating Corp. Thread rolling dies. 4,713,954, Cl. 72-88.000.
Costruzioni Aeronautiche Giovanni Agusta S.p.A.: *See*—
Bandera, Gianluigi, 4,713,933, Cl. 60-39.500.
Cottman, Kirkwood S.: *See*—
Colvin, Howard A.; Cottman, Kirkwood S.; and Parker, Dane K., 4,714,772, Cl. 558-240.000.
Cotton, Dale L.; and Nachman, Frank J., to General Motors Corporation. Method of manufacturing a polyphenylene sulfide potted pole and coil assembly. 4,714,576, Cl. 264-46.500.
Counter, Louis F.; Born, Richard C.; Walters, LeRoy M.; Ziese, Lowell B.; and Searing, Lawrence G., to Rexnord Inc. Apparatus for detecting cracks in a flexible coupling. 4,714,917, Cl. 340-679.000.
Cousse, Henri; Delhon, Andre ; Rieu, Jean-Pierre; and Patoiseau, Jean-Francois, to P. F. Medicament. Halo-biphenyl tertiary alcohols

useful in therapy in the treatment of atherosclerosis. 4,714,789, Cl. 568-807.000.

Coutarel, Alain. Apparatus to maneuver cables or conduits passing over a direction changer. 4,714,380, Cl. 405-168.000.

Couture, Michael V.: *See*—
Keklak, Ronald; Couture, Michael V.; and Whitehouse, John C., 4,713,885, Cl. 30-162.000.

Covert, Charles H.; Gifford, William E.; Kemler, Craig G.; and Paddock, Gordon R., to General Motors Corporation. Fuel vapor storage canister. 4,714,485, Cl. 55-189.000.

Cox, John C.; Morgan, Stephen E.; Hamblett, Martin; and Rubini, Alfred, to Rolls-Royce plc. Aerofoil section members for turbine engines. 4,714,407, Cl. 415-192.000.

Craft, Jack; Low, Michael L.; and Yorkanis, Bernard J., to RCA Corporation. Level shifter for a power supply regulator in a television apparatus. 4,714,871, Cl. 323-315.000.

Crafts, Harold S.: *See*—
Gay, Richard B.; and Crafts, Harold S., 4,714,876, Cl. 324-73.00R.

Craig Medical Products Ltd.: *See*—
Steer, Peter L., 4,714,465, Cl. 604-340.000.

Crawford, Carl R.; and Freundlich, David A., to Elscint Incorporated. Data reduction in reprojection systems. 4,714,997, Cl. 364-414.000.

Crawford, Robert D.; Johnson, Wayne J.; Kimber, Theo, Jr.; Nolff, Douglas; Volk, Jack R.; and Franks, Donald C., to Ford Motor Company. Vehicular data transfer communication system. 4,715,031, Cl. 370-85.000.

Cremer, Heinz P.; Wolsiefer, Harald; Hoffmann, Manfred; Deegener, Elmar; and Franzmann, Gunter, to Keiper Recaro GmbH & Co. Hinge fitting. 4,713,986, Cl. 74-805.000.

Creswell, Paul J.: *See*—
Spradley, Willie D.; and Creswell, Paul J., 4,714,238, Cl. 254-93.00R.

Creutz, Walter; Dahlhaus, Peter; and Hofmann, Heinz, to Hoesch Aktiengesellschaft. Track spike with a single or double shaft. 4,714,195, Cl. 238-349.000.

Cripps, Martin D.; and Field, Anthony J., to National Research Development Corporation. Interconnection networks. 4,714,922, Cl. 340-825.000.

Croft Metals, Inc.: *See*—
Bancroft, Joseph C., 4,713,861, Cl. 16-222.000.

Croket, Francis M., to AMSTED Industries Incorporated. Pressure filter cake-breaking method and apparatus. 4,714,557, Cl. 210-769.000.

Crookshanks, Rex J., to Hughes Aircraft Company. FDMA communications channel synchronizer. 4,715,029, Cl. 370-70.000.

Crotet, Eric: *See*—
Chaumeau, Alain; Crotet, Eric; Kerdraon, Alain; and Ragonnet, Jean-Paul, 4,714,022, Cl. 102-476.000.

Crouzet, Pierre, to BP Chemicals Limited. Treatment of catalyst particles. 4,714,553, Cl. 210-533.000.

Crown City Plating Co.: *See*—
Coombes, Robert L., Jr.; Owen, Merrill J.; Colwell, Terance C.; and Walker, Donald E., 4,714,535, Cl. 204-297.00W.

Crozier, James R., Jr.: *See*—
McAliley, J. Eugene; Daumit, Gene P.; Ethridge, Frederick A.; and Crozier, James R., Jr., 4,714,642, Cl. 428-113.000.

Cubic Corporation: *See*—
Wells, Leon W.; and Hauschild, Werner, 4,713,890, Cl. 33-366.000.

Cuisinarts Research & Development, Inc.: *See*—
Williams, James E., 4,714,203, Cl. 241-36.000.

Cummings, Michael J.; Hanford, Donald E.; and Japp, Robert M., to International Business Machines Corporation. Process of laminating a photosensitive layer of a substrate. 4,714,504, Cl. 156-64.000.

Cuomo, Jerome J.: *See*—
Clark, Gregory J.; Chaudhari, Praveen; Cuomo, Jerome J.; Frisch, Margaret A.; and Speidell, James L., 4,714,831, Cl. 250-305.000.

Cuse, Arthur R. System for the transmission of power. 4,714,371, Cl. 403-355.000.

Custeau, Lincoln. Exhaust pipe coupler. 4,714,279, Cl. 285-239.000.

CXA Ltd./CXA LTEE: *See*—
Kelly, George G.; McLaughlin, Henry; and Simon, James R., 4,714,017, Cl. 102-275.300.

Cytocolor Incorporated: *See*—
Kass, Lawrence, 4,714,606, Cl. 424-3.000.

D.R.I.M. Limited: *See*—
Langham, Richard J., 4,714,285, Cl. 292-163.000.

D'Agostino, Nicholas, to National Tool & Manufacturing Co., Inc. Quick-switch mold set with clamp means. 4,714,421, Cl. 425-192.00R.

Dahlhaus, Peter: *See*—
Creutz, Walter; Dahlhaus, Peter; and Hofmann, Heinz, 4,714,195, Cl. 238-349.000.

Daicel Chemical Industries, Ltd.: *See*—
Shibata, Tohru; and Okamoto, Ichiro, 4,714,555, Cl. 210-635.000.

Daihatsu Motor Company Limited: *See*—
Yoshida, Ryo; and Aikawa, Hiroshi, 4,714,451, Cl. 474-28.000.

Daikin Kogyo Co., Ltd.: *See*—
Hoashi, Jyuzaemon; Fumoto, Syozo; and Oshita, Kiyoshi, 4,714,748, Cl. 526-255.000.

Daimler-Benz Aktiengesellschaft: *See*—
Merkle, Josef, 4,714,287, Cl. 293-102.000.
Woerner, Guenter; Tscheplak, Ernst; and Moser, Franz, 4,714,449, Cl. 464-68.000.

Dainichi Shoji Co., Ltd.: *See*—
Kishida, Yoshifumi; and Takeuchi, Masayoshi, 4,714,086, Cl. 134-83.000.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Nishida, Fumihiko; Nanri, Seiji; and Yahata, Makoto, 4,714,947, Cl. 355-95.000.

D'Albaret, Bertrand; and Colombani, Antoine, to Compagnie D'electronique et de Piezo-electricite. Dielectric filter with variable central frequency. 4,714,906, Cl. 333-202.000.

Daler, Helmo: *See*—
Muller, Klaus; Mutz, Bernd; and Daler, Helmo, 4,714,392, Cl. 411-175.000.

Damour, Philippe; Patoureau, Alain; Somma, Jack J.; and Thompson, Ronald J., to Federal-Mogul Corporation. Composite thrust bearing formed by a radial bearing with at least one separate axial thrust collar. 4,714,356, Cl. 384-275.000.

Danieli & C. Officine Meccanichi SpA: *See*—
Poloni, Alfredo; Drigani, Fausto; and Canzutti, Roberto, 4,714,355, Cl. 384-193.000.

Danielski, Andrew: *See*—
Hascal, Marcel; Lopez, Sergio; Danielski, Andrew; and Mihai, Adrian, 4,714,915, Cl. 340-657.000.

Dannert, Horst; Ganser, Hans-Gunther; Schafer, Ralf; and Stormberg, Hans-Peter, to U.S. Philips Corporation. Circuit arrangement for igniting and operating gas discharge lamps. 4,714,862, Cl. 315-244.000.

Daumer, Rolf: *See*—
Bohmler, Heinz; Daumer, Rolf; Mayer, Dieter; and Perenthaler, Egbert, 4,715,009, Cl. 364-565.000.

Daumit, Gene P.: *See*—
McAliley, J. Eugene; Daumit, Gene P.; Ethridge, Frederick A.; and Crozier, James R., Jr., 4,714,642, Cl. 428-113.000.

Dautzenberg, Horts: *See*—
Henklein, Peter; Becker, Manfred; Buttner, Werner; Loth, Fritz; Dautzenberg, Horts; Forner, Klaus; Dolling, Rudolf; Graul, Karl-Heinz; Halatsch, Wolf-Rainer; and Rupprich, Christian, 4,714,768, Cl. 548-435.000.

Davi, Richard A., to Rolodex Corp. Hole punch assembly. 4,713,995, Cl. 83-167.000.

David, Samuel: *See*—
Thies, Peter W.; David, Samuel; Kuehl, Ulrich; Buschmann, Gerd; and Flecker, Peter, 4,714,709, Cl. 514-414.000.

Davidson, Eldon F. Digital averaging filter particularly suited for use with air navigation receivers. 4,714,929, Cl. 342-439.000.

Davis, Benjamin L.; Dixon, Joseph M.; and Page, Nicholas D., to Mobil Oil Corporation. Method for treating aggregate materials with wax and compositions thereof with bitumen for road surfaces. 4,714,629, Cl. 427-138.000.

Davis, Paul C.: *See*—
Andrews, George E.; Davis, Paul C.; Farley, Dennis C.; Kravitz, Stanley H.; Meeker, Thrygve R.; Petersen, Owe G.; and Schelling, Arthur W., 4,715,049, Cl. 375-106.000.

Dayton Machine Tool Company: *See*—
Siler, G. Daniel, 4,714,388, Cl. 409-146.000.

Dean, Robert A.: *See*—
Fair, David L.; Dean, Robert A.; and Sangster, Arlon G., 4,714,534, Cl. 204-269.000.

De Antoniis, Mario; Fiorini, Mario; and Mazzamurro, Giuseppina, to Eniricerche S.p.A. Process for the synthesis of organofunctional silanes using isatoic anhydride or derivatives thereof. 4,714,769, Cl. 556-419.000.

Dech, James A., to Atlantic Richfield Company. Drainhole well completion. 4,714,117, Cl. 166-380.000.

Dechene, Ronald L.; and Newton, Robert E., to Auburn International, Inc. Flow measuring apparatus with analog, essentially linear output. 4,714,890, Cl. 324-454.000.

Deegener, Elmar: *See*—
Cremer, Heinz P.; Wolsiefer, Harald; Hoffmann, Manfred; Deegener, Elmar; and Franzmann, Gunter, 4,713,986, Cl. 74-805.000.

Deem, Jake O.; Kassik, Ronald W.; and Metteer, N. Bruce, to Motorola, Inc. Extremely accurate automatic frequency control circuit and method therefor. 4,715,001, Cl. 364-484.000.

Deere & Company: *See*—
Barber, Dennis R.; Delfs, Larry M.; and Burk, Ronnie F., 4,713,936, Cl. 60-403.000.
Gold, Raymond D.; and Riegel, Leo W., 4,713,873, Cl. 29-559.000.
Holm, David R.; and Peterson, Rudolph A., Jr., 4,714,227, Cl. 248-595.000.
Lange, Ronald W.; Reynolds, David F.; Lolley, David R.; and Freeman, Gary L., 4,713,881, Cl. 29-724.000.
Neumeyer, Lowell H., 4,714,033, Cl. 111-85.000.
Rohwedder, Helmut, 4,714,398, Cl. 414-503.000.
Zahn, Werner, 4,713,981, Cl. 74-479.000.

Degussa Aktiengesellschaft: *See*—
Strack, Hans; and Kleinschmit, Peter, 4,714,690, Cl. 502-64.000.

DeHart, Marvin L.; and Johnson, Dale B., to Philips Industries Inc. Ceiling air diffuser. 4,714,009, Cl. 98-40.130.

Delaney, Norma G.: *See*—
Gordon, Eric M.; Godfrey, Jollie D., Jr.; and Delaney, Norma G., 4,714,757, Cl. 530-329.000.

Delbosse, Andre : *See*—
Pin, Bernard; Delbosse, Andre ; and Dubreucq, Ivan, 4,714,976, Cl. 361-114.000.

Delfs, Larry M.: *See*—
Barber, Dennis R.; Delfs, Larry M.; and Burk, Ronnie F., 4,713,936, Cl. 60-403.000.

Delgoffe, Jean-Claude; Lobmann, Michele; and Zygraich, Nathan, to SmithKline-RIT. Temperature sensitive strain of bovine viral diarrhoea virus. 4,714,678, Cl. 435-235.000.

Delhon, Andre : *See*—
Cousse, Henri; Delhon, Andre ; Rieu, Jean-Pierre; and Patoiseau, Jean-Francois, 4,714,789, Cl. 568-807.000.

Del Mar, Jorge: *See*—
Morrison, Herbert M.; and Del Mar, Jorge, 4,714,820, Cl. 219-222.000.

Dene, Michael R. Readily assemblable lampshade, or the like. 4,714,987, Cl. 362-352.000.

Denison, Samuel J. M.; and Bashford, David P., to Westland plc. Helicopter rotor. 4,714,409, Cl. 416-134.00A.

Denizou, Jean-Pierre, to Fragema. Actuating device for linearly moving a cluster of control elements in a nuclear reactor. 4,714,582, Cl. 376-233.000.

De Robertis, Patrick: *See*—
Bartolo, William; Boillot, Louis; Challande, Rene ; De Robertis, Patrick; Duchenaud, Jacky; and Ramaciotti, Jean-Claude, 4,714,907, Cl. 335-45.000.

Dervan, Andrew H.: *See*—
Kordomenos, Panagiotis I.; and Dervan, Andrew H., 4,714,743, Cl. 525-418.000.
Kordomenos, Panagiotis I.; and Dervan, Andrew H., 4,714,744, Cl. 525-438.000.
Kordomenos, Panagiotis I.; and Dervan, Andrew H., 4,714,745, Cl. 525-438.000.

De Shon, Dennis A. Multiple drive buoyancy engine. 4,713,937, Cl. 60-495.000.

Deshpandey, Chandra V.: *See*—
Chopra, Kasturi L.; Bunshah, Roitan F.; Deshpandey, Chandra V.; and Vankar, Vasant D., 4,714,625, Cl. 427-35.000.

Design Components Incorporated: *See*—
Palmin, Simyon; and Shlain, Vladimir, 4,714,867, Cl. 318-696.000.

Desvard, Alain: *See*—
Trinh Dinh, Chan; Desvard, Alain; and Martino, Germain, 4,714,688, Cl. 502-33.000.

Desyllas, Peter L. L.; and Holt, Nicholas P., to International Computers Limited. Data storage apparatus. 4,714,990, Cl. 364-200.000.

Detrex Corporation: *See*—
Sokalski, Stanley M., 4,714,752, Cl. 528-153.000.

Dettling, Joseph C.: *See*—
Wan, Chung-Zong; and Dettling, Joseph C., 4,714,694, Cl. 502-304.000.

Deuterium Corporation: *See*—
Spevack, Jerome S., 4,714,525, Cl. 203-10.000.

Deutsch, Ralph, to Kawai Musical Instrument Mfg. Co., Ltd. Dual mode musical tone generator using stored musical waveforms. 4,713,997, Cl. 84-1.220.

Deutsche Vortex GmbH: *See*—
Kuhl, Hans-Dieter; and Schmidt, Hans-Dieter, 4,714,484, Cl. 55-170.000.

Deutscher, Anneliese, heir: *See*—
Franek, Henning; Broemer, Heinz; Deutscher, Klaus, deceased; and Schaefer, Roland, 4,714,721, Cl. 523-113.000.

Deutscher, Klaus, deceased: *See*—
Franek, Henning; Broemer, Heinz; Deutscher, Klaus, deceased; and Schaefer, Roland, 4,714,721, Cl. 523-113.000.

Devecchi, Daniele; and Torelli, Guido, to SGS Microelettronica SpA. Low offset voltage follower circuit. 4,714,845, Cl. 307-496.000.

Dever, Gerald R.: *See*—
Bordoloi, Binoy K.; Ozari, Yehuda; and Dever, Gerald R., 4,714,655, Cl. 428-345.000.

Devine, Thomas M., Jr., to General Electric Company. Composite rotary anode for X-ray tube and process for preparing the composite. 4,715,055, Cl. 378-144.000.

DFC New Zealand Limited: *See*—
Buckle, Ian G.; and Michael, John P., 4,713,917, Cl. 52-167.000.

Diamond Publishing: *See*—
Engel, James E.; and Diamond, Sidney, 4,714,275, Cl. 281-15.00R.

Diamond, Sidney: *See*—
Engel, James E.; and Diamond, Sidney, 4,714,275, Cl. 281-15.00R.

Dickinson, Norman L., to Dipac Associates. Pollution-free pressurized combustion utilizing a controlled concentration of water vapor. 4,714,032, Cl. 110-347.000.

DiDomenico, Robert A., to Intermedics Infusaid, Inc. Positive pressure programmable infusion pump. 4,714,462, Cl. 604-67.000.

Diel, Robert L.: *See*—
Skinner, Jerald P.; Zlotky, Richard A.; and Diel, Robert L., 4,714,225, Cl. 248-523.000.

Diesel Kiki Co., Ltd.: *See*—
Kurihara, Kazumasa; and Arai, Kenji, 4,714,145, Cl. 192-0.052.

Digital Equipment Corporation: *See*—
Oakes, Alan E., 4,715,036, Cl. 371-37.000.

Dignan, Donald J., to Eastern Company, The. Clamping type cabinet lock. 4,714,283, Cl. 292-48.000.

Di Leo, Vincenzo. Filtering case for separating a liquid from a solid, in particular for dehydrating slurries from industrial processes. 4,714,549, Cl. 210-224.000.

Dillon, Joseph J.: *See*—
Bell, Robert L.; and Dillon, Joseph J., 4,714,135, Cl. 182-6.000.

Di Mino, Alfonso; and Di Mino, Andre, to ADM Tronics Unlimited, Inc. Technique for treating manufactured thick film resistors. 4,714,911, Cl. 338-195.000.

Di Mino, Andre: *See*—
Di Mino, Alfonso; and Di Mino, Andre, 4,714,911, Cl. 338-195.000.

DiMonte, Michael J.: *See*—
Shulof, George F.; and DiMonte, Michael J., 4,714,202, Cl. 241-30.000.

Dinizo, Stephen E.: *See*—
Kogan, Marcelo; Dinizo, Stephen E.; and Fancher, Llewellyn W., 4,714,493, Cl. 71-99.000.

Dipac Associates: *See*—
Dickinson, Norman L., 4,714,032, Cl. 110-347.000.

Distaffen, Patsy S. Fishing lure of the spoon type. 4,713,906, Cl. 43-42.500.

Dittert, Karen K., to Exxon Production Research Co. Method for filtering and combining seismic data having different spectral characteristics. 4,715,021, Cl. 367-41.000.

Dixon, Dale D.: *See*—
Burgoyne, William F., Jr.; and Dixon, Dale D., 4,714,778, Cl. 564-305.000.

Dixon, Joseph M.: *See*—
Davis, Benjamin L.; Dixon, Joseph M.; and Page, Nicholas D., 4,714,629, Cl. 427-138.000.

Do-All Jewelry Mfg. Co., Inc.: *See*—
Geldwerth, Simon, 4,713,865, Cl. 24-616.000.

Dobias, Bohuslav: *See*—
von Rybinski, Wolfgang; Tesmann, Holger; and Dobias, Bohuslav, 4,714,544, Cl. 209-167.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
Mueller, Robert, 4,714,129, Cl. 180-248.000.
Szodfridt, Imre; and Knoblauch, Richard, 4,714,147, Cl. 192-87.150.
Wichart, Klaus, 4,714,057, Cl. 123-90.150.

Dr. Johannes Heidenhain GmbH: *See*—
Andernach, Dieterich; and Wurm, Manfred, 4,714,920, Cl. 340-747.000.
Huber, Erich, 4,714,349, Cl. 356-374.000.

Dr. Karl Thomae GmbH: *See*—
Roch, Josef; Heckel, Armin; Nickl, Josef; Muller, Erich; Narr, Berthold; Zimmermann, Rainer; and Weisenberger, Johannes, 4,714,698, Cl. 514-212.000.

Dohzono, Masatake; Miyashita, Iwao; and Abe, Norihiro, to Kao Corporation. Absorbent member for tampon. 4,714,466, Cl. 604-378.000.

Dolling, Rudolf: *See*—
Henklein, Peter; Becker, Manfred; Buttner, Werner; Loth, Fritz; Dautzenberg, Horts; Forner, Klaus; Dolling, Rudolf; Graul, Karl-Heinz; Halatsch, Wolf-Rainer; and Rupprich, Christian, 4,714,768, Cl. 548-435.000.

Domeier, Wayne H.: *See*—
Chin, Laurence D.; Hiscock, Christopher J.; and Domeier, Wayne H., 4,714,865, Cl. 318-563.000.

Domen, Jean-Paul. Globe maps and derived products. 4,714,351, Cl. 368-17.000.

Domino Printing Sciences PLC.: *See*—
Erskine, William G.; and Marsden, Richard J., 4,714,931, Cl. 346-75.000.

Domovs, Jean R.; and Rice, Willard H., to Domovs, Jean R. Hygienic wheelchair seat for extended use. 4,713,848, Cl. 4-480.000.

Domtar Inc.: *See*—
Avedesian, Michael M., 4,714,591, Cl. 422-140.000.

Dona, Marinus J. J.: *See*—
Koster, Marinus P.; Soemers, Hermanus M. J. R.; and Dona, Marinus J. J., 4,713,977, Cl. 74-191.000.

Dormehl, Erich, to Heyligenstaedt & Comp. Werkzeugmaschinenfabrik GmbH. Tool changer. 4,713,875, Cl. 29-568.000.

Dorr-Oliver Incorporated: *See*—
McCoy, Daniel E.; Garver, Donald L.; and Hileman, George, 4,714,049, Cl. 122-4.00D.

Dow Chemical Company, The: *See*—
Christy, Mark R.; and Ecker, Ernest L., 4,714,729, Cl. 524-281.000.
Graham, Stephen L.; and Plunkett, David O., 4,714,728, Cl. 524-272.000.
Juhl, Roger L.; Potter, James L.; and Polemenakos, Sotiros C., 4,714,736, Cl. 524-608.000.
Liu, Ming-Biann, 4,714,771, Cl. 558-102.000.
Najvar, Daniel J.; Pope, Brian G.; and Loeffler, Norman R., 4,714,722, Cl. 523-218.000.
Olson, Robert S., 4,714,604, Cl. 423-488.000.
Park, Chung P., 4,714,716, Cl. 521-80.000.
Rubens, Louis C.; and Alexander, Willard E., 4,713,927, Cl. 53-472.000.
Siegel, Sanford A.; and Noding, Stephen A., 4,714,665, Cl. 429-192.000.
Tomalia, Donald A.; and Wilson, Larry R., 4,713,975, Cl. 73-865.800.
van Eijl, Ahazuerus T., 4,714,793, Cl. 585-4.000.

Dow Corning Wright Corporation: *See*—
Brooks, John G., Jr.; and Spires, Walter P., Jr., 4,714,474, Cl. 623-20.000.
Fichera, Alfred J.; and Chiarizzio, Samuel J., 4,714,477, Cl. 623-22.000.

Dowa Iron Powder Co., Ltd.: *See*—
Omori, Shigeru; Watanabe, Masatsugu; and Oboshi, Fumio, 4,714,622, Cl. 427-11.000.

Dowd, Paul; Kaufman, Christopher; and Abeles, Robert H., to University of Pittsburgh. Cyclopropanone hydrate derivatives. 4,714,777, Cl. 562-506.000.

Drake, Bick R.: *See*—
Marabotto, Eduardo J.; Bresin, Mark S.; and Drake, Bick R., 4,714,439, Cl. 439-627.000.

Dravo Corporation: *See*—
Binzen, Willard; and Catan, Robert S., 4,714,097, Cl. 141-5.000.

Drigani, Fausto: *See*—
Poloni, Alfredo; Drigani, Fausto; and Canzutti, Roberto, 4,714,355, Cl. 384-193.000.

Driscoll, Patrick R.; and Kremer, Ross A., to Mobil Oil Corporation. Process for production of phosphoric acid from dry matrix by SO_3 treatment and extraction. 4,714,600, Cl. 423-319.000.

Dross, Joachim: *See*—
Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Dross, Joachim; and Jungverdorben, Hermann-Josef, 4,714,045, Cl. 118-420.000.

Drzyzga, Michael, Jr.: *See*—
Grabowski, Stanley E., 4,713,868, Cl. 29-275.000.

Drzyzga, Richard: *See*—
Grabowski, Stanley E., 4,713,868, Cl. 29-275.000.

Duane, Willis J.: *See*—
Bajgert, Teddy A.; Bunker, Neall H.; Cochran, James L.; Duane, Willis J.; and Mojica, Arturo, 4,714,946, Cl. 355-75.000.

Dubreucq, Ivan: *See*—
Pin, Bernard; Delbosse, Andre ; and Dubreucq, Ivan, 4,714,976, Cl. 361-114.000.

Duchenaud, Jacky: *See*—
Bartolo, William; Boillot, Louis; Challande, Rene ; De Robertis, Patrick; Duchenaud, Jacky; and Ramaciotti, Jean-Claude, 4,714,907, Cl. 335-45.000.

Dudeck, David H., to Heron Manufacturing, Inc. Upright jig. 4,713,907, Cl. 43-42.390.

Dufford, Edward L.: *See*—
Chang, Wen H.; Prucnal, Paul J.; Peffer, John R.; Dufford, Edward L.; and Ambrose, Ronald R., 4,714,738, Cl. 525-58.000.

Duffy, James J., to Ford Motor Company. Speed sensitive power steering pump unload valve. 4,714,413, Cl. 417-293.000.

Dugas, Roger A., to Hewlett-Packard Company. Support for transformer windings. 4,714,909, Cl. 336-192.000.

Duinker, Simon: *See*—
Vlasbloem, Hugo; and Duinker, Simon, 4,715,056, Cl. 378-152.000.

Dumbleton, John H.: *See*—
Wang, Kathy K.; Gustavson, Larry J.; and Dumbleton, John H., 4,714,468, Cl. 623-16.000.

Dummert, Johannes: *See*—
Hahn, Alfred; Kamm, Bodo; Weiss, Karl; and Dummert, Johannes, 4,715,057, Cl. 378-197.000.

Dumoulin, Charles L.; and Hart, Howard R., Jr., to General Electric Company. Methods for NMR angiography. 4,714,081, Cl. 128-653.000.

Duncan, George I.; and Phelps, Stephen L., to Advance Transformer Company. Protected potted metallized film capacitor. 4,714,979, Cl. 361-274.000.

Duncan, Karen. Self-supporting ear protector. 4,713,843, Cl. 2-209.000.

Duncan, Stuart S.: *See*—
Woodcock, Brian H.; and Duncan, Stuart S., 4,714,309, Cl. 350-3.700.

Dunnagan, Cecil A. Carpet pad knife. 4,713,884, Cl. 30-294.000.

Du Pont de Nemours, E. I., and Company: *See*—
Buckmaster, Marlin D., 4,714,756, Cl. 528-481.000.
Cescon, Lawrence A.; Trebilcock, Robert W.; and Moffett, Robert H., 4,714,503, Cl. 149-21.000.
Gruber, Mark B., 4,714,509, Cl. 156-272.200.
Howell, Gary W., 4,714,210, Cl. 242-55.300.
Kordomenos, Panagiotis I.; and Dervan, Andrew H., 4,714,743, Cl. 525-418.000.
Kordomenos, Panagiotis I.; and Dervan, Andrew H., 4,714,744, Cl. 525-438.000.
Kordomenos, Panagiotis I.; and Dervan, Andrew H., 4,714,745, Cl. 525-438.000.
Rapoport, Morris, 4,714,773, Cl. 558-338.000.

Dupuy, Timothy C. Attachment for a firearm. 4,713,905, Cl. 42-85.000.

Durkee Industrial Foods Corp.: *See*—
Kozlowski, Thomas A.; Lindstrom, Robert O.; Loughrin, Thomas D.; and Baka, Kathleen J., 4,714,181, Cl. 222-480.000.

Durkoppwerke GmbH: *See*—
Riss, Gerhard; and Fuerhoff, Richard, 4,714,034, Cl. 112-113.000.

Duro-test Corporation: *See*—
Goldstein, Irving S., 4,714,857, Cl. 313-112.000.

Dusel, Robert O.; Keene, Harold J.; Berres, James; and Blaha, Gerald, to Artos Engineering Company. Lead making machine. 4,713,880, Cl. 29-564.400.

Duthaler, Rudolf: *See*—
Pfeifer, Josef; and Duthaler, Rudolf, 4,714,669, Cl. 430-325.000.

Dvorak, Robert F., to Square D Company. Self-contained ground fault test feature in circuit breaker. 4,714,975, Cl. 361-44.000.

Dyki, Joseph J., to Ford Motor Company. Electrical connector. 4,714,437, Cl. 439-595.000.

Dysarz, Edward D. Device to relieve sucker rod torque below ground level in a petroleum well. 4,714,110, Cl. 166-68.000.

E&G Classics, Inc.: *See*—
Eash, David D., 4,714,290, Cl. 296-210.000.

E. R. Squibb & Sons, Inc.: *See*—
Feld, Thomas A.; Juri, Pedro N.; and Treher, Elizabeth N., 4,714,605, Cl. 424-1.100.
Gordon, Eric M.; Godfrey, Jollie D., Jr.; and Delaney, Norma G., 4,714,757, Cl. 530-329.000.
Misra, Raj N., 4,714,714, Cl. 514-572.000.

Eash, David D., to E&G Classics, Inc. Simulated padded car roof cover. 4,714,290, Cl. 296-210.000.

Eastern Company, The: *See*—
Dignan, Donald J., 4,714,283, Cl. 292-48.000.

Eastman Kodak Company: *See*—
Ahern, Douglas K.; Fowlkes, William Y.; and Rimai, Donald S., 4,714,939, Cl. 355-3.0TR.
Bischoff, Gene L.; and Elly, James E., 4,714,969, Cl. 360-66.000.
Bizjak, John F., 4,714,967, Cl. 360-48.000.
Malloy Desormeaux, Stephen G., 4,714,335, Cl. 354-214.000.
McClure, Richard J.; and Jeffers, Frederick J., 4,714,324, Cl. 350-362.000.
Randall, Kent A., 4,714,241, Cl. 271-3.100.
Steele, Bruce B.; Rushing, Allen J.; and Robinson, Kelly S., 4,714,046, Cl. 118-657.000.
Vogel, Richard M., 4,714,963, Cl. 358-213.260.

Eaton Corporation: *See*—
Speranza, Donald, 4,714,144, Cl. 192-0.084.

Eaton, John R., to International Computers Limited. Microprogram control apparatus having variable mapping between microinstruction control bits and generated control signals. 4,714,991, Cl. 364-200.000.

Eberspaecher, Joerg, to Siemens Aktiengesellschaft. Circuit arrangement for a communications system for the transmission of message information from narrowband and broadband terminal equipment within a local network constructed as a loop. 4,715,026, Cl. 370-1.000.

Ecker, Ernest L.: *See*—
Christy, Mark R.; and Ecker, Ernest L., 4,714,729, Cl. 524-281.000.

Eckert, Charles E., to Aluminum Company of America. Trough shear diffusor apparatus for fluxing molten metal and method. 4,714,494, Cl. 75-66.000.

Eckle, Otto; and Roser, Walter, to Komet Stahlhalter und Werkzeugfabrik Robert Breuning GmbH. Boring tool. 4,714,390, Cl. 409-234.000.

Eckman, Harold J., to Cadet Manufacturing Company. Housing for wall mounted heating unit. 4,714,194, Cl. 237-70.000.

Edakubo, Hiroo, to Canon Kabushiki Kaisha. Reproducing apparatus having recording speed discriminating system. 4,714,970, Cl. 360-73.000.

Eder, Ernest J.; and Goodwin, Laverne D. Reverse bend attachment for a sheet metal brake. 4,713,957, Cl. 72-319.000.

Edgar, Reuben W., Jr.; Gilstad, Dennis W.; and Branstetter, Ronald L., to Nippon Colin Co., Ltd. Method and apparatus for noninvasive monitoring of arterial blood oxygen saturation. 4,714,080, Cl. 128-633.000.

Edlund, Roy: *See*—
Mack, Theo; and Edlund, Roy, 4,714,259, Cl. 277-165.000.

Educational Experiences, Inc.: *See*—
Cayton, Nancy M., 4,713,891, Cl. 33-494.000.

Edwards, Clarence C. Method of color photography of black and white object. 4,714,334, Cl. 354-76.000.

Edwards, William, to C.C. Developments, Limited. Carbonizable fabrics of activated, carbonized fibers and differently activated or unactivated fibers. 4,714,649, Cl. 428-257.000.

Eguchi, Masaharu; Tosaka, Yoichi; Ohnuki, Ichiro; Aihara, Yoshihiko; and Ishizaki, Akira, to Canon Kabushiki Kaisha. Film data reading device. 4,714,332, Cl. 354-21.000.

Eguchi, Yoshio: *See*—
Miyazono, Tadafumi; Eguchi, Yoshio; Ogino, Akiharu; Sawada, Haruhiko; and Okude, Yoshitaka, 4,714,634, Cl. 427-409.000.

Eheim, Franz: *See*—
Bohringer, Wilfried; Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, 4,714,412, Cl. 417-289.000.

Ehlscheid, Guenter; and Hauschild, Gilbert, to Winkler & Duennebier Maschinenfabrik und Eisengieserei GmbH & Co. KG. Method and appartus for depositing a proper number of flexible work pieces in a proper position. 4,714,394, Cl. 414-41.000.

Eichelberger, Charles W.; and Wojnarowski, Robert J., to General Electric Company. Method to produce via holes in polymer dielectrics for multiple electronic circuit chip packaging. 4,714,516, Cl. 156-628.000.

Eichen, Elliot; Melman, Paul; and Cook, Kenneth, to GTE Laboratories Incorporated; and GTE Valeron Corporation. Frequency chirped interferometric displacement sensors and mechanical translation tips therefor. 4,714,346, Cl. 356-349.000.

Eijsermans, Antonius A. C. C., to U.S. Philips Corporation. Disc-record player comprising a disc-loading mechanism. 4,715,025, Cl. 369-75.200.

Einsle, Guenter: *See*—
Goldmann, Horst; Einsle, Guenter; Brugger, Rudolf; and Wacker, Josef, 4,713,866, Cl. 29-33.00K.

Eli Lilly and Company: *See*—
Garbrecht, William L.; Marzoni, Gifford P.; and Whitten, Kathleen R., 4,714,704, Cl. 514-288.000.

Ellcon-National, Inc.: *See*—
Shepherd, Robert W., 4,714,142, Cl. 188-185.000.

Elliott, Kenneth: *See*—
Atkins, Alan D.; Elliott, Kenneth; and Looms, John S. T., 4,714,800, Cl. 174-73.00R.

Elly, James E.: *See*—
Bischoff, Gene L.; and Elly, James E., 4,714,969, Cl. 360-66.000.

Eloy, Jean-Francois, to Commissariat a l'Energie Atomique. Process and apparatus for treating a material by a thermoionic effect with a view to modifying its physicochemical properties. 4,714,628, Cl. 427-53.100.

Elpatronic AG: *See*—
Kramer, Felix, 4,714,814, Cl. 219-79.000.

Elscint Incorporated: *See*—
Crawford, Carl R.; and Freundlich, David A., 4,714,997, Cl. 364-414.000.

Elscint Ltd.: *See—*
Paltiel, Zvi; and Ban, Amir, 4,714,885, Cl. 324-312.000.
Rappaport, Michael L.; and Blumenau, Leif, 4,713,945, Cl. 62-514.00R.

Elzer, Albert: *See—*
Schornick, Gunnar; Elzer, Albert; and Hofmann, Reiner, 4,714,751, Cl. 528-103.000.

Emcore, Inc.: *See—*
Wagner, Wilfried R., 4,714,091, Cl. 137-884.000.

Emmons, Lawrence D.: *See—*
Cooper-Hart, Michael A.; Emmons, Lawrence D.; Mackley, James S.; and Stokes, David H., 4,715,059, Cl. 379-53.000.

EMX International Limited: *See—*
Bartlett, David, 4,714,925, Cl. 340-825.550.

Enari, Masahiko: *See—*
Kanno, Hideo; Yamashita, Shinichi; Enari, Masahiko; Kuno, Mitsutoshi; and Mizutome, Atsushi, 4,714,921, Cl. 340-784.000.

Encon Associates Inc.: *See—*
Lockett, William, Jr., 4,714,542, Cl. 208-347.000.

Enderby, Ralph: *See—*
Kurtzman, Gary; Heck, Joseph P.; Hansen, Kenneth A.; Enderby, Ralph; and Vidugiris, Bronis, 4,714,899, Cl. 331-1.00A.

Engel, James E.; and Diamond, Sidney, to Diamond Publishing. Toy sticker collection album and collectible stickers therefor. 4,714,275, Cl. 281-15.00R.

Engelhard Corporation: *See—*
Wan, Chung-Zong; and Dettling, Joseph C., 4,714,694, Cl. 502-304.000.

Engle, Elbert, to Chesebrough-Pond's, Inc. Placket lining machine. 4,714,035, Cl. 112-114.000.

Engstrom, Randy J.: *See—*
Heggart, Ronald G.; McClintock, Willard K.; and Engstrom, Randy J., 4,715,042, Cl. 373-74.000.

Enichem Elastomeri S.p.A.: *See—*
Bruzzone, Mario; Gordini, Silvano; and Wyllie, Ken, 4,714,747, Cl. 526-64.000.

Eniricerche S.p.A.: *See—*
De Antoniis, Mario; Fiorini, Mario; and Mazzamurro, Giuseppina, 4,714,769, Cl. 556-419.000.

Eno, Philip A.: *See—*
Helinski, Richard R.; Lutz, Carl D.; Peer, Thomas R.; and Eno, Philip A., 4,714,936, Cl. 346-140.00R.

Enpece AB: *See—*
Thyren, Carl H.; and Hesthamar, Tore, 4,713,966, Cl. 73-149.000.

Entravision, Inc.: *See—*
Newton, Walter A., 4,714,464, Cl. 604-118.000.

Eppendorf Geratebau Netheler + Hinz GmbH: *See—*
Hofmeier, Gerhard; Petersen, Karl; and Schroeder, Wolfgang, 4,714,527, Cl. 204-1.00T.

Equipment Development Company, Inc.: *See—*
Swan, Leo, 4,714,294, Cl. 299-39.000.

Erickson, Robert H.: *See—*
Abbott, Edward H.; Erickson, Robert H.; and Horn, William F., 4,713,877, Cl. 29-596.000.

Ericson, Steven V.: *See—*
Kantrud, Steven G.; Ericson, Steven V.; and Seidel, Karl R., Jr., 4,714,150, Cl. 198-463.300.

Ermacora, Rino; and Krebs, Thierry, to Kuhn, S.A. Farm machine with improved transmission device. 4,714,123, Cl. 180-14.400.

Ernst Leitz Wetzlar GmbH: *See—*
Franek, Henning; Broemer, Heinz; Deutscher, Klaus, deceased; and Schaefer, Roland, 4,714,721, Cl. 523-113.000.

Erskine, William G.; and Marsden, Richard J., to Domino Printing Sciences PLC. Ink jet printing system. 4,714,931, Cl. 346-75.000.

Essilor International Cie Generale d'Optique: *See—*
Blot, Gerard, 4,714,232, Cl. 249-90.000.

Essilor Internationale: *See—*
Hennequin, Jean-Claude, 4,714,330, Cl. 351-239.000.

ETA Systems, Inc.: *See—*
Ketzler, John H. A., 4,714,924, Cl. 340-825.210.

Etat Francais: *See—*
Chaumeau, Alain; Crotet, Eric; Kerdraon, Alain; and Ragonnet, Jean-Paul, 4,714,022, Cl. 102-476.000.
Jaffre, Robert; and Ropars, Yvon, 4,714,041, Cl. 114-67.00A.

Ethridge, Frederick A.: *See—*
McAliley, J. Eugene; Daumit, Gene P.; Ethridge, Frederick A.; and Crozier, James R., Jr., 4,714,642, Cl. 428-113.000.

Ethyl Corporation: *See—*
Goins, Dixie E.; Holmes, Silas W.; and Burt, Edward A., 4,714,691, Cl. 502-152.000.

Evans, Richard P.: *See—*
Cecil, Don R.; and Evans, Richard P., 4,713,857, Cl. 15-97.00R.

Ex-Cell-O Corporation: *See—*
Preston, Frank J., 4,714,575, Cl. 264-46.400.

Exxon Chemical Patents Inc.: *See—*
Hodgson, William J., Jr.; and Middlesworth, Jeffrey A., 4,714,735, Cl. 524-514.000.
Michaelson, Robert C.; and Plotkin, Jeffrey S., 4,714,788, Cl. 568-697.000.

Exxon Production Research Co.: *See—*
Dittert, Karen K., 4,715,021, Cl. 367-41.000.

Exxon Research & Engineering Co.: *See—*
Hughes, Vincent L.; and Looney, Ralph W., 4,714,749, Cl. 526-290.000.
Rogers, Robert L., 4,714,934, Cl. 346-140.00R.
Vaughan, David E. W., 4,714,601, Cl. 423-329.000.

Eylon, Daniel; and Froes, Francis H., to United States of America, Air Force. Method for producing very fine microstructures in titanium alloy powder compacts. 4,714,587, Cl. 419-29.000.

EZ Mail Corporation: *See—*
Harlow, Albert L., Jr.; and Felske, Arthur M., 4,714,192, Cl. 232-17.000.

Fabinski, Walter, to Hartmann & Braun AG. Photometer. 4,714,832, Cl. 250-343.000.

FAG Kugelfischer Georg Schafer (KGaA): *See—*
Bayer, Oswald; Grehn, Martin; and Planek, Werner, 4,714,358, Cl. 384-470.000.

Fair, David L.; Dean, Robert A.; and Sangster, Arlon G., to Olin Corporation. Electrolytic halogenator device. 4,714,534, Cl. 204-269.000.

Falk, Theodore J.; and Morris, Lawrence E., to Greatbatch Enterprises, Inc. Low power electromagnetic valve. 4,714,234, Cl. 251-129.170.

Falotico, Robert: *See—*
Kanojia, Ramesh M.; Falotico, Robert; Tobia, Alfonso J.; and Press, Jeffery B., 4,714,705, Cl. 514-309.000.

Fancher, Llewellyn W.: *See—*
Kogan, Marcelo; Dinizo, Stephen E.; and Fancher, Llewellyn W., 4,714,493, Cl. 71-99.000.

Fansteel Inc.: *See—*
Gates, Alfred S., Jr., 4,714,660, Cl. 428-698.000.

Fanti, Cristoforo; Travaglio, Gianclaudio; Ferrario, Luciano; and Moscatelli, Saverio, to Alfa Romeo Auto S.p.A. Control apparatus for a vehicle with disengageable four-wheel drive. 4,714,127, Cl. 180-233.000.

Fanuc Ltd.: *See—*
Kawada, Shigeki; Amemiya, Yoichi; Sogabe, Masatoyo; and Kumagai, Kazushi, 4,714,852, Cl. 310-156.000.
Kiya, Nobuyuki; and Yoshino, Motoaki, 4,714,999, Cl. 364-474.000.

Farley, Dennis C.: *See—*
Andrews, George E.; Davis, Paul C.; Farley, Dennis C.; Kravitz, Stanley H.; Meeker, Thrygve R.; Petersen, Owe G.; and Schelling, Arthur W., 4,715,049, Cl. 375-106.000.

Farr, Glyn P. R., to Lucas Industries Public Limited Company. Hydraulic anti-skid braking systems for vehicles. 4,714,301, Cl. 303-116.000.

Farrall, George A.: *See—*
Harnden, John D., Jr.; Kornrumpf, William P.; and Farrall, George A., 4,714,847, Cl. 310-332.000.

Farrel Corporation: *See—*
Meeker, Gregory W.; Bleck, Norris E.; Rizzi, Marc A.; and Irick, Carl M., 4,714,422, Cl. 425-204.000.
Nortey, Narku O., 4,714,350, Cl. 366-84.000.

Farrier, Ernest G.: *See—*
Banerjee, Chandra K.; Farrier, Ernest G.; Reynolds, John H., IV; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Shannon, Michael D.; and Shelar, Gary R., 4,714,082, Cl. 131-359.000.

Fast, Jacob. Information display element for shelf and price channel use. 4,713,899, Cl. 40-10.00R.

Faugouin, Michel: *See—*
Poncelet, Andre ; Getti, Hyacinthe; and Faugouin, Michel, 4,714,626, Cl. 427-49.000.

Federal-Mogul Corporation: *See—*
Damour, Philippe; Patoureau, Alain; Somma, Jack J.; and Thompson, Ronald J., 4,714,356, Cl. 384-275.000.

Feichtlbauer, Werner, to Trak Incorporated. Ski running-surface plastic coating. 4,714,266, Cl. 280-604.000.

Feige, Manfred: *See—*
Bischofberger, Jurg; and Feige, Manfred, 4,714,153, Cl. 198-457.000.

Feissel, Henri: *See—*
Bacou, Claude; Baptiste, Rene; Feissel, Henri; Takats, Gilbert; and Cabrol, Christian, 4,714,828, Cl. 250-214.00C.

Feld, Thomas A.; Juri, Pedro N.; and Treher, Elizabeth N., to E. R. Squibb & Sons, Inc. Technetium-99m labeled dioxime complexes. 4,714,605, Cl. 424-1.100.

Felske, Arthur M.: *See—*
Harlow, Albert L., Jr.; and Felske, Arthur M., 4,714,192, Cl. 232-17.000.

Fernandes, Roosevelt A.; Smith-Vaniz, William R.; Burbank, John E., III; and Sieron, Richard L., to Niagara Mohawk Power Corporation. Apparatus for measuring the potential of a transmission line conductor. 4,714,893, Cl. 324-126.000.

Ferranti, plc: *See—*
McPherson, Hugh; and Stoker, Jeffrey, 4,714,873, Cl. 324-57.00N.
Sillitto: Hillary G., 4,714,321, Cl. 350-174.000.

Ferrario, Luciano: *See—*
Fanti, Cristoforo; Travaglio, Gianclaudio; Ferrario, Luciano; and Moscatelli, Saverio, 4,714,127, Cl. 180-233.000.

Ferris, Donald L.: *See—*
Byrnes, Francis E.; Ferris, Donald L.; Hibyan, Edward S.; Noehren, William L.; and Ogle, Peter C., 4,714,450, Cl. 464-90.000.

Fibercast Company: *See—*
Cagle, Larry L.; Andersen, Keith D.; and Lurvey, Victor E., 4,714,578, Cl. 264-255.000.

Fichera, Alfred J.; and Chiarizzio, Samuel J., to Dow Corning Wright Corporation. Ball-and-socket joint prosthesis with bearing insert. 4,714,477, Cl. 623-22.000.

Fidler, Fredrick H.; and Lowe, Thomas B., to Babcock & Wilcox Company, The. Mechanically attached two component ceramic fiber system. 4,714,072, Cl. 126-1.00F.

Field, Anthony J.: *See*—
Cripps, Martin D.; and Field, Anthony J., 4,714,922, Cl. 340-825.000.
Filiberti, Antonio. Ball valve, particularly for gases. 4,714,236, Cl. 251-315.000.
Fine Foods Research Cooperative Union: *See*—
Matsuda, Eiichi, 4,714,618, Cl. 426-524.000.
Finzenhagen, Manfred: *See*—
Hurnik, Helmut; Finzenhagen, Manfred; and Jeblick, Werner, 4,714,568, Cl. 252-350.000.
Fiorini, Mario: *See*—
De Antoniis, Mario; Fiorini, Mario; and Mazzamurro, Giuseppina, 4,714,769, Cl. 556-419.000.
Fischer, William B. Prosthesis, method, and tool for installing same. 4,714,478, Cl. 623-23.000.
Fisherwell Limited: *See*—
Mather, Graham W.; Warwick, Graham R.; and Bazeley, Graham A., 4,714,268, Cl. 280-646.000.
Flaherty, Patrick; and Bridgwater, Jon D., to Morton Metalcraft Company. Patient immersion vessel and system. 4,713,850, Cl. 4-585.000.
Flecker, Peter: *See*—
Thies, Peter W.; David, Samuel; Kuehl, Ulrich; Buschmann, Gerd; and Flecker, Peter, 4,714,709, Cl. 514-414.000.
Fletcher, David L.; and Graham, Arthur E., to International Business Machines Corporation. Electrophoretic insulation of metal circuit board core. 4,714,646, Cl. 428-204.000.
Floreancig, Antoine, to Uranium Pechiney. Process for the recovery in the form of tetravalent fluoride of uranium extracted from phosphate-bearing solutions. 4,714,596, Cl. 423-10.000.
Flow Cytometry Standards Corporation: *See*—
Schwartz, Abraham, 4,714,682, Cl. 436-10.000.
FlowMole Corporation: *See*—
Baker, Glen; Chau, Albert W.; and Mercer, John E., 4,714,118, Cl. 175-26.000.
Fluegel, Theodore D.; and Ryan, Daniel M., to Sundstrand Corporation. Integral gear box and electrical generating system. 4,713,982, Cl. 74-686.000.
Flugge, Jurgen: *See*—
Heller, Wilhelm; Flugge, Jurgen; and Ratz, Gerhard, 4,714,500, Cl. 148-12.00R.
Flusberg, Allen M.: *See*—
Rokni, Mordechai; and Flusberg, Allen M., 4,714,902, Cl. 332-7.510.
Flynn, Kenneth C. Method of making metal sculptures. 4,714,188, Cl. 228-120.000.
FMC Corporation: *See*—
Brolin, Charles A., 4,714,808, Cl. 219-9.500.
Focqueur, Herve ; and Jumel, Bernard, to Valeo. Torsional damper device. 4,714,448, Cl. 464-68.000.
Fonnesbeck, Dale D.: *See*—
Wilson, Bart A.; Jenkins, Vaughn J.; and Fonnesbeck, Dale D., 4,714,837, Cl. 307-289.000.
Force, Christian; and Lescure, Alain, to Novatome. Anti-vibratory support device for a pipe whose thickness is small relative to the diameter. 4,714,229, Cl. 248-610.000.
Ford Motor Company: *See*—
Abbott, Edward H.; Erickson, Robert H.; and Horn, William F., 4,713,877, Cl. 29-596.000.
Crawford, Robert D.; Johnson, Wayne J.; Kimber, Theo, Jr.; Nolff, Douglas; Volk, Jack R.; and Franks, Donald C., 4,715,031, Cl. 370-85.000.
Duffy, James J., 4,714,413, Cl. 417-293.000.
Dyki, Joseph J., 4,714,437, Cl. 439-595.000.
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Tosswill, Christopher H., 4,714,861, Cl. 315-117.000.
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Garrett, Charles B.: *See*—
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Gasko, William F.: *See*—
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Gassaway, J. Scott. Method for forming a countersink in a plate. 4,713,960, Cl. 72-412.000.
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Gaug, Robert T. Tool for manually rotating the star wheel of a brake adjuster. 4,713,991, Cl. 81-176.100.
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Howell, Edward K., 4,714,807, Cl. 200-144.00B.
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McCready, Russell J.; and Tyrell, John A., 4,714,753, Cl. 528-288.000.
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McCready, Russell J.; and Tyrell, John A., 4,714,755, Cl. 528-288.000.
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Premerlani, William J., 4,715,000, Cl. 364-484.000.
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Lambert, David K., 4,713,970, Cl. 73-861.050.
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Giroud, Anne-Marie, to Commissariat a l'Energie Atomique. Phenylcyclohexyl dicarboxylates. 4,714,775, Cl. 560-194.000.
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Grundei, Hans; and Aigner, Reinhard, to S & G Implants GmbH. Tibial member of a knee joint endoprothesis. 4,714,475, Cl. 623-20.000.
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Ioannides, Gregor, 4,713,964, Cl. 73-116.000.
GT Development Corporation: *See*—
Morris, John M., 4,714,172, Cl. 220-86.00R.
GTE Laboratories Incorporated: *See*—
Eichen, Elliot; Melman, Paul; and Cook, Kenneth, 4,714,346, Cl. 356-349.000.
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Guay, Normand D., to George C. Moore Co. Elastic fabric provided with a looped gripping surface. 4,714,096, Cl. 139-391.000.
Guggenheim, Thomas L., to General Electric Company. Method for making tetrahydroxydiphenylsulfide and product obtained therefrom. 4,714,780, Cl. 564-430.000.
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Miller, Mike F.; and Gunther, Kim M., 4,715,039, Cl. 372-37.000.
Gupta, Balaram B. G., to Hoechst Celanese Corporation. Process for producing 4-ring-substituted phenyl lower alkyl ketones. 4,714,781, Cl. 568-319.000.
Gustavson, Larry J.: *See*—
Wang, Kathy K.; Gustavson, Larry J.; and Dumbleton, John H., 4,714,468, Cl. 623-16.000.
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H. B. Fuller Company: *See*—
Hume, Robert M., III, 4,714,727, Cl. 524-271.000.
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Schmidt, Henning; Nedele, Walter; and Schmodde, Hermann, 4,713,948, Cl. 66-106.000.
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Haddad, Kenneth R.; and Vilmur, Richard J., to Motorola, Inc. Speakerphone for radio and landline telephones. 4,715,063, Cl. 379-390.000.

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Henklein, Peter; Becker, Manfred; Buttner, Werner; Loth, Fritz; Dautzenberg, Horts; Forner, Klaus; Dolling, Rudolf; Graul, Karl-Heinz; Halatsch, Wolf-Rainer; and Rupprich, Christian, 4,714,768, Cl. 548-435.000.

Hale, Bryan M.: *See*—
Hale, Cecil H.; Tanner, Alan R.; and Hale, Bryan M., 4,714,530, Cl. 204-131.000.

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Hamada, Akifumi: *See*—
Shimomura, Hiroshi; Iizuka, Kazuo; Harano, Makoto; and Hamada, Akifumi, 4,714,383, Cl. 407-42.000.

Hamaguri, Kenji; and Sakai, Takao, to Minolta Camera Kabushiki Kaisha. Multi-wavelength oximeter having a means for disregarding a poor signal. 4,714,341, Cl. 356-41.000.

Hamajima, Shigemitsu: *See*—
Yasuda, Keiji; Oda, Yukihisa; Hamajima, Shigemitsu; Ishii, Masami; Nakanishi, Katsumi; Tsuzuki, Takayoshi; and Tsuda, Jyou, 4,714,804, Cl. 200-11.0DA.

Hamamatsu Photonics Kabushiki Kaisha: *See*—
Oba, Koichiro, 4,714,825, Cl. 250-213.0VT.

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Miyashita, Yoshinobu; Hamanaka, Tadashi; and Iwata, Kenzi, 4,714,675, Cl. 435-32.000.

Hamar, Martin R. Laser apparatus for monitoring geometric errors. 4,714,344, Cl. 356-152.000.

Hamblett, Martin: *See*—
Cox, John C.; Morgan, Stephen E.; Hamblett, Martin; and Rubini, Alfred, 4,714,407, Cl. 415-192.000.

Hambley, Allan R., to Harris Corporation. Digital differential phase shift keyed demodulator. 4,715,047, Cl. 375-84.000.

Hamel, David O.: *See*—
Sielaff, Ulrich; and Hamel, David O., 4,713,923, Cl. 52-713.000.

Hammond, Michael R.; and Novorsky, Donald E., to Tocco, Inc. Method and apparatus for shaping the surfaces of cams on a camshaft. 4,714,809, Cl. 219-10.430.

Hancock, Bynum V., to Westinghouse Electric Corp. Trailing edge support for control stage steam turbine blade. 4,714,410, Cl. 416-193.00A.

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Becherer, Johannes; Handte, Reinhardt; Nestler, Hans J.; and Kussmaul, Ulrich, 4,714,766, Cl. 548-217.000.

Hanford, Donald E.: *See*—
Cummings, Michael J.; Hanford, Donald E.; and Japp, Robert M., 4,714,504, Cl. 156-64.000.

Hann, William L.; and Fuller, Stanley E., to Commercial Aluminum Cookware Company. Supporting rack for cooking utensils. 4,714,166, Cl. 211-113.000.

Hansen, Charles: *See*—
Palmero, Albert; and Hansen, Charles, 4,714,853, Cl. 310-257.000.

Hansen, Kenneth A.: *See*—
Kurtzman, Gary; Heck, Joseph P.; Hansen, Kenneth A.; Enderby, Ralph; and Vidugiris, Bronis, 4,714,899, Cl. 331-1.00A.

Happy, Henry: *See*—
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Hara, Kazuya, to Casio Computer Co., Ltd. Memory card. 4,714,980, Cl. 361-395.000.

Harada, Kunio: *See*—
Kato, Yasuo; Harada, Kunio; Kubota, Shigeo; Watanabe, Yoshio; and Murayama, Seiichi, 4,715,054, Cl. 378-122.000.

Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, to Toyota Jidosha Kabushiki Kaisha; and Aisin-Warner Kabushiki Kaisha. Transmission control device. 4,713,988, Cl. 74-868.000.

Harandi, Mohsen N., to Mobil Oil Corporation. Apparatus for minimizing recycling in an unsaturated gas plant. 4,714,524, Cl. 196-98.000.

Harano, Makoto: *See*—
Shimomura, Hiroshi; Iizuka, Kazuo; Harano, Makoto; and Hamada, Akifumi, 4,714,383, Cl. 407-42.000.

Harbor Branch Oceanographic Institution Inc.: *See*—
Tietze, Richard C., 4,714,288, Cl. 294-82.330.

Hardwood Lighting Designs Corp.: *See*—
Brooks, Raymond E., Jr., 4,713,916, Cl. 52-39.000.

Hardy, Frederick E.: *See*—
Wevers, Jean; Barrat, Christian R.; and Hardy, Frederick E., 4,714,565, Cl. 252-174.190.

Harelstad, Roberta E.; and Stevens, John, to Minnesota Mining and Manufacturing Company. Second harmonic generation with N,N'-substituted barbituric acids. 4,714,838, Cl. 307-427.000.

Harhoff, Karl; and Melis, Egon, to Gewerkschaft Eisenhutte Westfalia GmbH. Material and transfer loading apparatus. 4,714,154, Cl. 198-514.000.

Harlow, Albert L., Jr.; and Felske, Arthur M., to EZ Mail Corporation. Slidable tray insert for mailboxes. 4,714,192, Cl. 232-17.000.

Harnden, John D., Jr.; Kornrumpf, William P.; and Farrall, George A., to General Electric Company. Advanced piezoceramic power switching devices employing protective gastight enclosure and method of manufacture. 4,714,847, Cl. 310-332.000.

Harra, David J.: *See*—
Freeman, Kenneth F.; Garrett, Charles B.; Harra, David J.; and Lei, Lawrence C., 4,714,536, Cl. 204-298.000.

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Bloebaum, Roy D., 4,714,473, Cl. 623-20.000.

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Harris, Steven: *See*—
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Harrison, Kim A. Fluorescent light bulb holder. 4,714,162, Cl. 206-419.000.

Hart, Cornelis M.; and Slob, Arie, to U.S. Philips Corporation. Integrated injection logic circuits. 4,714,842, Cl. 307-477.000.

Hart, Howard R., Jr.: *See*—
Dumoulin, Charles L.; and Hart, Howard R., Jr., 4,714,081, Cl. 128-653.000.

Hartl, Carroll P.; and Heitman, James M., to Oscar Mayer Foods Corporation. Automatic crimping mechanism for proteinaceous patties. 4,714,014, Cl. 99-450.200.

Hartmann & Braun AG: *See*—
Fabinski, Walter, 4,714,832, Cl. 250-343.000.

Hartmann, Ludwig; and Ruzek, Ivo, to Carl Freudenberg, Firma. Elastic roofing and sealing materials. 4,714,651, Cl. 428-286.000.

Hartog, Arthur H.; and Payne, David N., to National Research Development Corporation. Fibre optic sensing device and method. 4,714,829, Cl. 250-227.000.

Hascal, Marcel; Lopez, Sergio; Danielski, Andrew; and Mihai, Adrian. Portable electrostatic field safety monitor. 4,714,915, Cl. 340-657.000.

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Hashimoto, Minoru: *See*—
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Hashimoto, Takatsugu; Maehara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, to Bridgestone Corp.; Toshiba Silicone Co., Ltd.; and Japan Synthetic Rubber Co., Ltd. Rubber compounds. 4,714,734, Cl. 524-496.000.

Hata, Hideo: *See*—
Oda, Kazuyuki; Yui, Yoshikiyo; Kataoka, Yoshiharu; and Hata, Hideo, 4,714,331, Cl. 353-122.000.

Hatakoshi, Makoto: *See*—
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Hatch, G. Brent, to Hatch, G. Brent; and Hatch, Susan W. Machine for laying conduit and methods for use thereof. 4,714,381, Cl. 405-178.000.

Hatch, Susan W.: *See*—
Hatch, G. Brent, 4,714,381, Cl. 405-178.000.

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Koch, Steven R.; Stein, Charles R.; Hatfield, William T.; Shapiro, Neil R.; and Hughes, William C., 4,715,030, Cl. 370-85.000.

Hatton, John H.; and Batt, Gregory L. Multi-axis articulated all terrain vehicle. 4,714,140, Cl. 180-20.000.

Hattori, Isao; and Furukawa, Shigeru, to NGK Insulators, Ltd. Evacuating device for plunger molding apparatus. 4,714,423, Cl. 425-376.00R.

Hattori, Tadashi: *See*—
Ikeda, Hirotane; Hattori, Tadashi; Ohta, Minoru; and Mukainakano, Shinichi, 4,714,047, Cl. 118-724.000.

Hattori, Takemi; and Takeda, Nobuhiko, to Aisin Seiki Kabushiki Kaisha. Lumbar support. 4,714,291, Cl. 297-284.000.

Hattori, Tetsuo; and Seko, Shoichi, to Toyota Jidosha Kabushiki Kaisha. Suspension of vehicle. 4,714,132, Cl. 180-312.000.

Hattori, Yoshiyuki: *See*—
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Haubold, Heinz-Gunter; and Hiller, Peter, to Kernforschungsanlage Julich GmbH. Process and circuit arrangement for the remote pick up and reproduction of images of static or moving objects. 4,714,961, Cl. 358-209.000.

Hauptmann, Rudolf: *See*—
Siegel, Harald; and Hauptmann, Rudolf, 4,714,927, Cl. 342-160.000.

Hauschild, Gilbert: *See*—
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Hauschild, Werner: *See*—
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Hausen, Manfred Z.: *See*—
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Hawkins, Ronald G., to Aluminum Company of America. Overhead conductor damper with stamped and sand-cast parts. 4,714,799, Cl. 174-42.000.

Hayakawa, Yoichi; Kawai, Masao; Nishikawa, Seiichi; and Fukumura, Kagenori, to Aisin Warner Limited. Shift shock suppression in automatic transmission. 4,713,989, Cl. 74-869.000.

Hayakawa, Yoichi: *See*—
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Hayashi, Kyozo; and Noda, Shigeru, to Sumitomo Electric Industries, Ltd. Connector for optical fibers with a gap. 4,714,318, Cl. 350-96.210.

Hayashi, Shigeyuki: *See*—
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Hayashi, Toyoaki: *See*—
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Hayter, Paul A.: *See*—
Bailey, John W.; Hayter, Paul A.; Mason, Brian R.; and Turner, Graham N., 4,714,875, Cl. 324-73.0PC.
Healy, John T.; and Johnson, Joel W., to Westinghouse Electric Corp. Combustor feeding arrangement. 4,714,031, Cl. 110-109.000.
Heartz, Robert A., to General Electric Company. Terrain/seascape image generator with math model data base. 4,715,005, Cl. 364-521.000.
Heath, Alastair E. F.: *See*—
Bussey, Stephen; Cockburn, Barry; and Heath, Alastair E. F., 4,714,998, Cl. 364-431.010.
Heath, Allan B.; and Gossman, Richard G. Liquid atomizing nozzle for spray apparatus. 4,714,199, Cl. 239-412.000.
Hebert, Joel J.; and Chuang, Jo-Yu, to Schlumberger Technology Corporation. Apparatus for hard rock sidewall coring a borehole. 4,714,119, Cl. 175-20.000.
Hecht, David. Method and apparatus for making bows. 4,714,182, Cl. 223-46.000.
Heck, Joseph P.: *See*—
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Hedberg, Sven-Erik; Lekholm, Anders; and Lindgren, Anders, to Siemens Aktiengesellschaft. Atrium-controlled heart pacemaker. 4,714,079, Cl. 128-419.0PG.
Heekin, Theodore R., to Valco/Valley Tool & Die, Inc. Picture frame clamp. 4,714,373, Cl. 403-402.000.
Heess, Gerhard; Karnopp, Dean; and van Zanten, Anton, to Robert Bosch GmbH. Pressure modulator for anti-skid brake systems. 4,714,300, Cl. 303-115.000.
Heggart, Ronald G.; McClintock, Willard K.; and Engstrom, Randy J., to Union Carbide Corporation. Furnace cooling system and method. 4,715,042, Cl. 373-74.000.
Heinlein, Werner: *See*—
Gassmann, Heiner; Beck, Siegfried; and Heinlein, Werner, 4,714,278, Cl. 285-169.000.
Heinrich, Juergen; Krauth, Axel; Victor, Karl-Heinz; and Peeken, Heinz, to Hoechst Ceramtec Aktiengesellschaft; and Pacific Wietz GmbH & Co. KG. Annular sliding body for a sliding seal and process for use thereof. 4,714,257, Cl. 277-1.000.
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Heitzmann, Hal: *See*—
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Helinski, Richard R.; Lutz, Carl D.; Peer, Thomas R.; and Eno, Philip A., to Howtek, Inc. Ink jet printer. 4,714,936, Cl. 346-140.00R.
Heller, Wilhelm; Flugge, Jurgen; and Ratz, Gerhard, to Krupp Stahl AG. Method for thermal treatment of pearlitic rail steels. 4,714,500, Cl. 148-12.00R.
Helling, Gunter; and Himmelmann, Wolfgang, to Agfa Gevaert Aktiengesellschaft. Color photographic recording material containing a polymeric gelatine plasticizer. 4,714,671, Cl. 430-545.000.
Hellstrom, Lars, to N.V. Optimed. Visual aid especially for weak-sighted persons. 4,714,329, Cl. 351-158.000.
Hemphill, Charles W. Reversible digging teeth and holder therefor. 4,713,897, Cl. 37-83.000.
Henderson, Dale K., to Temet, USA, Inc. Blast-resistant door latching system. 4,714,282, Cl. 292-36.000.
Hendy, Brian N.; and Smith, John W., to Imperial Chemical Industries PLC. Membranes. 4,714,725, Cl. 524-108.000.
Henkel Kommanditgesellschaft auf Aktien: *See*—
Kuenzel, Werner, 4,714,643, Cl. 428-131.000.
von Rybinski, Wolfgang; Tesmann, Holger; and Dobias, Bohuslav, 4,714,544, Cl. 209-167.000.
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Henklein, Peter; Becker, Manfred; Buttner, Werner; Loth, Fritz; Dautzenberg, Horts; Forner, Klaus; Dolling, Rudolf; Graul, Karl-Heinz; Halatsch, Wolf-Rainer; and Rupprich, Christian, to Akademie Der Wissenschaften Der DDR. N-(chlorocarbonyloxy)-5-norbornene-2,3-dicarboximide, process for its production and its use. 4,714,768, Cl. 548-435.000.
Hennequin, Jean-Claude, to Esailor Internationale. Device for detecting and/or measuring visual deficiencies. 4,714,330, Cl. 351-239.000.
Henning, Rainer: *See*—
Urbach, Hansjorg; Henning, Rainer; Teetz, Volker; and Becker, Reinhard, 4,714,708, Cl. 514-412.000.
Henry, Daniel P.; LaTorre, Fredrick E.; and Pope, Willard I. Educational board game. 4,714,255, Cl. 273-249.000.
Henthorn, Clyde E. Golf ball and tee setter. 4,714,250, Cl. 273-32.500.
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Hernandez, Irene H.: *See*—
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Hernandez, Rosalio A. Cooking vessel with an inner heat conductive jacket and the like. 4,714,012, Cl. 99-444.000.
Heron Manufacturing, Inc.: *See*—
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Herrington, Fox J., to Mobil Oil Corporation. Apparatus for producing machine-direction heat seals. 4,714,454, Cl. 493-193.000.
Herrington, Fox J., to Mobil Oil Corporation. Hem folder with integral tape inserter for making draw tape bags. 4,714,455, Cl. 493-225.000.
Hertsgaard, John P.; and Gallant, W. Keith, to Honeywell Inc. Enabling device for a gas generator of a forced dispersion munitions dispenser. 4,714,020, Cl. 102-351.000.
Herve, Michel, to S.A. Fonderies du Lion. Heating apparatus operating with gaseous fuel and designed to be connected to a smoke pipe. 4,714,073, Cl. 126-91.00R.
Hess, Herman A. Separable fastener with sliding sleeve. 4,713,864, Cl. 24-590.000.
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Kaplinsky, George T., 4,714,937, Cl. 346-140.00R.
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Hickey, Charles P. Trick-or-treat carrier with false bottom. 4,714,985, Cl. 362-154.000.
Higashigaki, Yoshiyuki; Yoshimoto, Yoshikazu; Suzuki, Tomonari; Nakajima, Shigeo; and Inoguchi, Toshio, to Sharp Kabushiki Kaisha. Methods and materials for thermoelectric and light-heat conversion. 4,714,639, Cl. 428-36.000.
Hileman, George: *See*—
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Hill, Bernhard, to U.S. Philips Corporation. Magneto-optical printing head and method of grey-scale image generation using such a printing head. 4,714,325, Cl. 350-376.000.
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Hillstrom, David U.; and Cope, Dennis R., to Marketing Displays, Inc.; and B. F. Goodrich Company. Sign stand assembly. 4,714,220, Cl. 248-160.000.
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Hiroi, Kazuo; and Ito, Kojiro, to Kabushiki Kaisha Toshiba. Feedforward feedback control having predictive disturbance compensation. 4,714,988, Cl. 364-165.000.
Hironaka, Yoshiaki, to Kioritz Corporation. Power train of mowing machine. 4,714,447, Cl. 464-52.000.
Hirsch, Rolf-Burkhard: *See*—
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Hitachi Cable, Ltd.: *See*—
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Hitachi Kiden Kogyo Kabushiki Kaisha: *See*—
Watanabe, Seiji; Horimoto, Teiji; and Koizumi, Susumu, 4,714,155, Cl. 198-619.000.
Hitachi, Ltd.: *See*—
Ikeda, Hiraku; and Kuwashima, Hidesumi, 4,714,401, Cl. 415-30.000.
Kato, Yasuo; Harada, Kunio; Kubota, Shigeo; Watanabe, Yoshio; and Murayama, Seiichi, 4,715,054, Cl. 378-122.000.
Matsubara, Katsumi; Uchida, Riichi; Muramatsu, Masatoshi; Naya, Kotaro; and Takagi, Tsuneharu, 4,714,418, Cl. 418-201.000.
Mizuno, Takao; Uchikawa, Naoshi; Murayama, Akira; Tamura, Takahiro; and Kuroshima, Ryoichi, 4,714,415, Cl. 418-14.000.
Nishimura, Ryuji; Kato, Minoru; Noda, Masaru; and Imaide, Takuya, 4,714,955, Cl. 358-48.000.

Hitachi Maxell, Ltd.: *See*—
Kato, Yoshitake; Fujita, Minoru; and Maruyama, Hiroshi, 4,714,973, Cl. 360-133.000.

Hitachi Metals, Ltd.: *See*—
Yamashita, Keitaro, 4,714,819, Cl. 219-216.000.

Hiyamizu, Satoshi: *See*—
Mimura, Takashi; and Hiyamizu, Satoshi, 4,714,948, Cl. 357-22.000.

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Hocken, Robert J.: *See*—
Lau, Kam C.; and Hocken, Robert J., 4,714,339, Cl. 356-4.500.

Hodgson, William J., Jr.; and Middlesworth, Jeffrey A., to Exxon Chemical Patents Inc. Oriented elastomeric film and method of manufacture. 4,714,735, Cl. 524-514.000.

Hodroski, Frank S., Jr. Foot rest for toilet. 4,713,846, Cl. 4-254.000.

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Urbach, Hansjorg; Henning, Rainer; Teetz, Volker; and Becker, Reinhard, 4,714,708, Cl. 514-412.000.
Wiedemann, Wolfgang; Spietschka, Ernst; and Troester, Helmut, 4,714,666, Cl. 430-59.000.

Hoechst Celanese Corporation: *See*—
Gupta, Balaram B. G., 4,714,781, Cl. 568-319.000.

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Heinrich, Juergen; Krauth, Axel; Victor, Karl-Heinz; and Peeken, Heinz, 4,714,257, Cl. 277-1.000.

Hoefle, Milton L.; Holmes, Ann; and Stratton, Charlotte D., to Warner-Lambert Company. Antiarteriosclerotic substituted benzimidazol-2-yl-and 3H-imidazo[4,5-b]pyridin-2-yl-phenoxy-alkanoic acids and salts and esters thereof. 4,714,762, Cl. 514-303.000.

Hoehn, Herbert; and Strommer, Kurt, to L. Schuler GmbH. Transfer press. 4,713,961, Cl. 72-419.000.

Hoelzer, John S.; Graefe, Richard J.; and Libert, James T., to Square D Company. Electronic delay timer. 4,714,977, Cl. 361-196.000.

Hoerkens, Reiner. Ornamental chain. 4,713,946, Cl. 63-4.000.

Hoesch Aktiengesellschaft: *See*—
Creutz, Walter; Dahlhaus, Peter; and Hofmann, Heinz, 4,714,195, Cl. 238-349.000.

Hofer, Gerald: *See*—
Bohringer, Wilfried; Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, 4,714,412, Cl. 417-289.000.

Hoffmann, Manfred: *See*—
Cremer, Heinz P.; Wolsiefer, Harald; Hoffmann, Manfred; Deegener, Elmar; and Franzmann, Gunter, 4,713,986, Cl. 74-805.000.

Hoffmann, Wolfgang W., to Shibuya America Corporation. Straight line container labeling apparatus. 4,714,515, Cl. 156-450.000.

Hofmann, Albert, to Kernforschungszentrum Karlsruhe GmbH. Method for cooling an object with the aid of superfluid helium (He II) and apparatus for implementing the method. 4,713,942, Cl. 62-62.000.

Hofmann, Heinz: *See*—
Creutz, Walter; Dahlhaus, Peter; and Hofmann, Heinz, 4,714,195, Cl. 238-349.000.

Hofmann, Reiner: *See*—
Schornick, Gunnar; Elzer, Albert; and Hofmann, Reiner, 4,714,751, Cl. 528-103.000.

Hofmeier, Gerhard; Petersen, Karl; and Schroeder, Wolfgang, to Eppendorf Geratebau Netheler + Hinz GmbH. Process for measuring the potential difference between a sample liquid and a reference electrolyte. 4,714,527, Cl. 204-1.00T.

Hok, Bertil: *See*—
Brogardh, Torgny; Hok, Bertil; and Ovren, Christer, 4,714,835, Cl. 250-486.100.

Hoke, Donald I., to Lubrizol Corporation, The. Acylated ether amine and lubricants and fuels containing the same. 4,714,561, Cl. 252-51.50A.

Hoke, Engelbert; and Butterweck, Helgard, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Device for purification of waste water. 4,714,548, Cl. 210-221.200.

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Holahan, Joseph M.; and Holahan, J. Myles, 4,714,208, Cl. 242-84.52B.

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Holik, Herbert, to Sulzer-Escher Wyss GmbH. Device for decelerating fast-flow currents of white water. 4,714,522, Cl. 162-264.000.

Holleran, Louis M.; and Martin, Francis W., to Corning Glass Works. Glass-ceramics suitable for dielectric substrates. 4,714,687, Cl. 501-9.000.

Holm, David R.; and Peterson, Rudolph A., Jr., to Deere & Company. Seat suspension for an off-road vehicle. 4,714,227, Cl. 248-595.000.

Holmes, Ann: *See*—
Hoefle, Milton L.; Holmes, Ann; and Stratton, Charlotte D., 4,714,762, Cl. 514-303.000.

Holmes, Silas W.: *See*—
Goins, Dixie E.; Holmes, Silas W.; and Burt, Edward A., 4,714,691, Cl. 502-152.000.

Holt, James F., to United States of America, Air Force. Method of bonding protective covers onto solar cells. 4,714,510, Cl. 437-2.000.

Holt, Nicholas P.: *See*—
Desyllas, Peter L. L.; and Holt, Nicholas P., 4,714,990, Cl. 364-200.000.

Holz, Gary L.; and Foster, Walter M., to BMP. Video processor. 4,714,958, Cl. 358-166.000.

Honda Giken Kogyo Kabushi Kaisha: *See*—
Yamaguchi, Akio; and Yoshikawa, Kazushi, 4,714,026, Cl. 108-51.100.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Kikuchi, Uhee; and Takeo, Tadashi, 4,714,044, Cl. 118-314.000.
Kinugasa, Toshiyuki; Furuya, Tamio; Ishige, Yoshiki; Tsuchimoto, Yuichi; and Takahashi, Shoji, 4,714,424, Cl. 425-388.000.
Muto, Osamu; Masumura, Masanori; and Hori, Yoshiaki, 4,713,979, Cl. 74-337.500.
Ohkuma, Kuniaki; Nakagawa, Reiji; Miyao, Hisao; Yoshimura, Shinichi; Suzuki, Toshio; Hayashi, Toyoaki; Arakawa, Masayasu; and Koizumi, Hideharu, 4,714,397, Cl. 414-222.000.
Shinozaki, Takashi; and Kawaguchi, Takeshi, 4,714,126, Cl. 180-233.000.
Takayanagi, Shinji, 4,714,453, Cl. 474-112.000.
Tottori, Takumi; Oki, Kenji; Ooyama, Kazuo; and Mizushima, Toshio, 4,714,056, Cl. 123-65.0PE.

Honda, Keijiro: *See*—
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, 4,714,791, Cl. 568-913.000.

Honeywell Inc.: *See*—
Hertsgaard, John P.; and Gallant, W. Keith, 4,714,020, Cl. 102-351.000.

Honeywell Information Systems Italia: *See*—
Troletti, Bonifacio, 4,714,968, Cl. 360-51.000.

Honkura, Yoshinobu; Murata, Kouji; and Yokoyama, Takashi, to Aichi Steel Works, Ltd. Soft magnetic stainless steel for cold forging. 4,714,502, Cl. 148-307.000.

Honna, Takaji: *See*—
Ogawa, Kazuo; and Honna, Takaji, 4,714,765, Cl. 548-183.000.

Hoopengardner, Merle R., to Orcon Corporation. Baseplate construction for an iron used to face seam carpet with hot melt adhesive tape. 4,714,514, Cl. 156-391.000.

Hooven, Michael D., to Cordis Corporation. Three stage valve with flexible valve seat. 4,714,458, Cl. 604-9.000.

Hooven, Michael D., to Cordis Corporation. Three stage intracranial pressure control valve. 4,714,459, Cl. 604-9.000.

Hoper, Jens: *See*—
Kessler, Manfred; and Hoper, Jens, 4,714,673, Cl. 435-14.000.

Hoppe, Lutz; and Reinhardt, Eugen, to Wolff Walsrode Aktiengesellschaft. Adhesive solutions, more especially for water-activatable adhesive coatings on wallpapers. 4,714,723, Cl. 524-42.000.

Hopper, Roger J.; and Parks, Carl R., to Goodyear Tire & Rubber Company, The. Cyanamide derivatives as vulcanization rate modifiers. 4,714,742, Cl. 525-346.000.

Hori, Roy Y.: *See*—
Webb, John D., Jr.; Hori, Roy Y.; and Simpson, George E., 4,714,470, Cl. 623-18.000.

Hori, Yoshiaki: *See*—
Muto, Osamu; Masumura, Masanori; and Hori, Yoshiaki, 4,713,979, Cl. 74-337.500.

Horiki, Seinosuke; Makino, Reiji; Ito, Kuninori; and Unno, Tetsuji, to Nagoya Oilchemical Co., Ltd. Expanding and shrinking member. 4,714,633, Cl. 427-282.000.

Horimoto, Teiji: *See*—
Watanabe, Seiji; Horimoto, Teiji; and Koizumi, Susumu, 4,714,155, Cl. 198-619.000.

Horn, Peter; Baumann, Edwin; and Marx, Matthias, to BASF Aktiengesellschaft. Nylon moldings and their production. 4,714,718, Cl. 521-134.000.

Horn, William F.: *See*—
Abbott, Edward H.; Erickson, Robert H.; and Horn, William F., 4,713,877, Cl. 29-596.000.

Horvath, Csaba: *See*—
Ambrus, Clara M.; and Horvath, Csaba, 4,714,556, Cl. 210-638.000.

Hosaka, Masao: *See*—
Inoue, Yutaka; Kurata, Mitsuru; Kasama, Nobuhiro; Hosaka, Masao; Yagasaki, Toshiaki; Tanioka, Hiroshi; and Yamakawa, Tadashi, 4,714,940, Cl. 355-3.00R.

Hoshino, Takashi, to Bridgestone Corporation. Rubber composition for tire inner liner. 4,714,732, Cl. 524-474.000.

Hoshino, Yukio: *See*—
Takagi, Masayoshi; Hoshino, Yukio; and Yamauchi, Hiroki, 4,713,876, Cl. 29-568.000.

Hoss, Donald A.: *See*—
Keenan, Daniel J.; and Hoss, Donald A., 4,714,169, Cl. 220-8.000.

Hough, Geoffrey S., to Rolls-Royce plc. Turbines. 4,714,406, Cl. 415-170.00R.

House, David W.; and Scott, Ray V., Jr., to UOP Inc. Polyurethane coatings and adhesives. 4,714,512, Cl. 156-306.600.

Howell, Edward K., to General Electric Company. Low voltage vacuum circuit interrupter. 4,714,807, Cl. 200-144.00B.

Howell, Gary W., to Du Pont de Nemours, E. I., and Company. Dispensing apparatus. 4,714,210, Cl. 242-55.300.

Howtek, Inc.: *See*—
Helinski, Richard R.; Lutz, Carl D.; Peer, Thomas R.; and Eno, Philip A., 4,714,936, Cl. 346-140.00R.

Hozn Auto & Soft Co., Ltd.: *See*—
Chen, Sun C., 4,714,805, Cl. 200-16.00A.

Hsieh, Ming-Shiun: *See*—
Kabasawa, Satoshi; Hsieh, Ming-Shiun; Chang, Shih-Ming; and Lin, Chun-Hong, 4,715,004, Cl. 364-513.500.

Hsieh, Yung-Ao: *See*—
Seltzman, Herbert H.; and Hsieh, Yung-Ao, 4,714,619, Cl. 426-548.000.

Hsu, Li-Chien; and Heitzmann, Hal, to Baxter Travenol Laboratories, Inc. Dye silane compositions. 4,714,770, Cl. 556-419.000.
Hsueh, Liming: *See—*
Nigrini, Andrew; and Hsueh, Liming, 4,714,112, Cl. 166-252.000.
Huang, Ming-Chien, to St. Island Intl. Patent & Trademark Office. Convertible suspension mounting system for ceiling fans. 4,714,230, Cl. 248-613.000.
Hubbard, Leo J.; and Kerivan, Leo J., to Precision Handling Devices, Inc. Perforated web feeding apparatus. 4,714,185, Cl. 226-74.000.
Huber, Erich, to Dr. Johannes Heidenhain GmbH. Photoelectric length or angle measuring instrument. 4,714,349, Cl. 356-374.000.
Huels Aktiengesellschaft: *See—*
Muller, Dieter J.; and Wehmeyer, Heinrich, 4,714,792, Cl. 570-261.000.
Huet, Roger, to Aluminum Company of America. Aluminum alloy having improved properties. 4,714,588, Cl. 420-534.000.
Huggins, Richard A., to Automatic Connector, Inc. Hermetic seal for electrical coaxial connector. 4,714,432, Cl. 439-271.000.
Hughes Aircraft Company: *See—*
Crookshanks, Rex J., 4,715,029, Cl. 370-70.000.
Hughes Tool Company: *See—*
King, William W., 4,714,120, Cl. 175-329.000.
Hughes, Vincent L.; and Looney, Ralph W., to Exxon Research & Engineering Co. Fully saturated petroleum resin and hot melt pressure sensitive adhesive formulations utilizing same as tackifier. 4,714,749, Cl. 526-290.000.
Hughes, William C.: *See—*
Koch, Steven R.; Stein, Charles R.; Hatfield, William T.; Shapiro, Neil R.; and Hughes, William C., 4,715,030, Cl. 370-85.000.
Huls Aktiengesellschaft: *See—*
Moeller, Eckhard; Mueller, Wolfgang H. E.; and Hausen, Manfred Z., 4,714,784, Cl. 568-492.000.
Hume, Robert M., III, to H. B. Fuller Company. Aqueous emulsion coating for individual fibers of a cellulosic sheet providing improved wet strength. 4,714,727, Cl. 524-271.000.
Hungerford, Charles S., Jr. Hanger for pipe clamp. 4,714,218, Cl. 248-62.000.
Hunt, Thomas K.: *See—*
Novak, Robert F.; Schmatz, Duane J.; and Hunt, Thomas K., 4,714,798, Cl. 136-239.000.
Hurnik, Helmut; Finzenhagen, Manfred; and Jeblick, Werner, to Bayer Aktiengesellschaft. New blowing agent combination based on azodicarbonamide, production thereof and use thereof for foaming polymers. 4,714,568, Cl. 252-350.000.
Hutchins, Erle M., to American Telephone and Telegraph Company, AT&T Technologies, Inc. Universal adapter and methods of and apparatus for making same. 4,714,440, Cl. 439-676.000.
Hutchinson, Sheryl A.: *See—*
Bunick, Frank J.; Hutchinson, Sheryl A.; and Cifrese, Ralph, 4,714,620, Cl. 426-572.000.
Hwang, Harrison. Packing film dispenser. 4,714,211, Cl. 242-96.000.
Hylsa, S.A.: *See—*
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Hyner, Jacob; and Gradowski, Steven, to Whyco Chromium Company, Inc. Process for making self-drilling fasteners. 4,713,855, Cl. 10-10.00R.
Hyodo, Keiichiro: *See—*
Iida, Kazumi; Ohata, Yosuke; Hyodo, Keiichiro; Akiyama, Kazunori; Umeda, Tadashi; and Kishimoto, Keiichi, 4,714,338, Cl. 355-3.0FU.
Iacoviello, John G., to Air Products and Chemicals, Inc. Metal container coating compositions comprising stable emulsions of water resistant polyvinyl alcohol-stabilized vinyl chloride-ethylene copolymers. 4,714,731, Cl. 524-459.000.
Ibuki, Noritaka: *See—*
Nagase, Masaomi; Takemoto, Eiji; Ibuki, Noritaka; and Hasegawa, Takashi, 4,714,068, Cl. 123-506.000.
Ichikawa, Kentaro, to Kabushiki Kaisha Toshiba. Mechanism for actuating deflector of Pelton wheel. 4,714,402, Cl. 415-35.000.
Ida, Shuichiro; Yoshinaka, Toshio; and Nagano, Shuji, to Toyota Jidosha Kabushiki Kaisha. Lubrication mechanism in power transfer device for four wheel drive. 4,713,980, Cl. 74-467.000.
Ide, Takashi, to Sumitomo Electric Industries, Ltd. Optical fiber characteristic measurement. 4,714,343, Cl. 356-73.100.
Idegren, Gustav L.; Gyllstal, Lars-Goran L.; and Bartha, Istvan V., to Inter Innovation AB. Lockable cassette for valuable objects. 4,714,029, Cl. 109-45.000.
Idemitsukosan Kabushiki Kaisha: *See—*
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Onamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.
Idosako, Hidetaka: *See—*
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Iguchi, Shigeki: *See—*
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Iida, Kazumi; Ohata, Yosuke; Hyodo, Keiichiro; Akiyama, Kazunori; Umeda, Tadashi; and Kishimoto, Keiichi, to Mita Industrial Co. Ltd. Electrostatic copying apparatus. 4,714,338, Cl. 355-3.0FU.
Iizuka, Kazuo: *See—*
Shimomura, Hiroshi; Iizuka, Kazuo; Harano, Makoto; and Hamada, Akifumi, 4,714,383, Cl. 407-42.000.
Ikeda, Hiraku; and Kuwashima, Hidesumi, to Hitachi, Ltd. Governing mode change-over apparatus. 4,714,401, Cl. 415-30.000.
Ikeda, Hirotane; Hattori, Tadashi; Ohta, Minoru; and Mukainakano, Shinichi, to Nippon Soken, Inc. Method and device for forming ultrafine particle film of compound. 4,714,047, Cl. 118-724.000.
Ikeda, Takashi. Piercing tool. 4,713,886, Cl. 30-366.000.
Illinois Institute of Technology: *See—*
Senkan, Selim M., 4,714,796, Cl. 585-328.000.
Illinois Tool Works Inc.: *See—*
Briggs, Paul C.; and Gosiewski, Donald E., 4,714,730, Cl. 524-321.000.
Imaide, Takuya: *See—*
Nishimura, Ryuji; Kato, Minoru; Noda, Masaru; and Imaide, Takuya, 4,714,955, Cl. 358-48.000.
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Imataki, Hiroyuki: *See—*
Usui, Masayuki; Imataki, Hiroyuki; Serizawa, Takashi; Baba, Takeshi; and Nose, Hiroyasu, 4,714,326, Cl. 350-485.000.
Imazu, Shigeki, to Mazda Motor Corporation. Control device for internal combustion engine. 4,714,064, Cl. 123-339.000.
Imoto, Yuzo; Wakata, Hideo; Takei, Toshihiro; and Hattori, Yoshiyuki, to Nippondenso Co., Ltd. Hydraulic control valve. 4,714,296, Cl. 303-6.00C.
Imperial Chemical Industries PLC: *See—*
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Hendy, Brian N.; and Smith, John W., 4,714,725, Cl. 524-108.000.
Imperial Metal & Chemical Company: *See—*
Amariti, Luigi; and Santos, Llandro C., 4,714,670, Cl. 430-331.000.
Imura, Toru: *See—*
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Inaba Seisakusho Ltd.: *See—*
Uredat-Neuhoff, Angela, 4,714,028, Cl. 108-144.000.
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, to Seitetsu Kagaku Co., Ltd.; Shinko Seito Co., Ltd.; and Shinko Sugar Production Co., Ltd. Process for recovering primary normal aliphatic higher alcohols. 4,714,791, Cl. 568-913.000.
Ingersoll-Rand Company: *See—*
Miller, Bernard F., 4,714,414, Cl. 418-11.000.
Inglis, Allan E.: *See—*
Ranawat, Chitranjan S.; Straub, Lee R.; Inglis, Allan E.; and Burstein, Albert H., 4,714,476, Cl. 623-21.000.
Ingold, John P. Frame mounting structure for a housing opening and method therefore. 4,713,922, Cl. 52-656.000.
Innovative Concepts Europe B.V.: *See—*
Ros, Johannes F., 4,713,951, Cl. 70-456.00R.
Ino, Kazuhide: *See—*
Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, 4,714,650, Cl. 428-265.000.
Inoguchi, Toshio: *See—*
Higashigaki, Yoshiyuki; Yoshimoto, Yoshikazu; Suzuki, Tomonari; Nakajima, Shigeo; and Inoguchi, Toshio, 4,714,639, Cl. 428-36.000.
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Inoue, Mamoru: *See—*
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Inoue, Takao: *See—*
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Yoshinaka, Tadaaki; Inoue, Takao; and Tomita, Kazuo, 4,714,965, Cl. 358-320.000.
Inoue, Tomohiro; Tsugei, Shinji; and Iguchi, Shigeki, to Sharp Kabushiki Kaisha. Schedule alarm device. 4,715,010, Cl. 364-705.000.
Inoue, Yasuo: *See—*
Sugahara, Kazuyuki; Nishimura, Tadashi; Kusunoki, Shigeru; and Inoue, Yasuo, 4,714,684, Cl. 437-19.000.
Inoue, Yutaka; Kurata, Mitsuru; Kasama, Nobuhiro; Hosaka, Masao; Yagasaki, Toshiaki; Tanioka, Hiroshi; and Yamakawa, Tadashi, to Canon Kabushiki Kaisha. Image processing apparatus having display means to monitor and display information from a date input section. 4,714,940, Cl. 355-3.00R.
Institut de Recherche et de Coordination Acoustique Musique IRCAM: *See—*
Kergomard, Jean; and Meynial, Xavier, 4,714,001, Cl. 84-386.000.
Institut Francais du Petrole: *See—*
Trinh Dinh, Chan; Desvard, Alain; and Martino, Germain, 4,714,688, Cl. 502-33.000.
Institut Textile DeFrance: *See—*
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Inter Innovation AB: *See—*
Idegren, Gustav L.; Gyllstal, Lars-Goran L.; and Bartha, Istvan V., 4,714,029, Cl. 109-45.000.
Intermedics Infusaid, Inc.: *See—*
DiDomenico, Robert A., 4,714,462, Cl. 604-67.000.
International Business Machines: *See—*
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Bajgert, Teddy A.; Bunker, Neall H.; Cochran, James L.; Duane, Willis J.; and Mojica, Arturo, 4,714,946, Cl. 355-75.000.
Barker, Barbara A.; and Hernandez, Irene H., 4,714,918, Cl. 340-724.000.

Barnett, Joseph A.; Gomez, Joseph M.; Green, William F.; Lisica, Vincent M.; and Rosenthal, Arnold B., 4,714,400, Cl. 414-751.000.

Buller, Marvin L.; Lumbra, Douglas L.; Phelps, Douglas W.; Samuelsen, Sigvart J.; and Ward, William C., 4,714,953, Cl. 357-81.000.

Cummings, Michael J.; Hanford, Donald E.; and Japp, Robert M., 4,714,504, Cl. 156-64.000.

Fletcher, David L.; and Graham, Arthur E., 4,714,646, Cl. 428-204.000.

Gladney, Henry M.; Lorch, Douglas J.; and Mattson, Richard L., 4,714,992, Cl. 364-200.000.

Gladney, Henry M.; Lorch, Douglas J.; and Mattson, Richard L., 4,714,996, Cl. 364-300.000.

Livingston, David L.; Sucher, Daniel J.; and Walk, Bruce M., 4,714,993, Cl. 364-200.000.

MaKosch, Gunter, 4,714,348, Cl. 356-351.000.

Oklobdzija, Vojin G.; and Ling, Daniel T., 4,714,994, Cl. 364-200.000.

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International Computers Limited: *See*—
Desyllas, Peter L. L.; and Holt, Nicholas P., 4,714,990, Cl. 364-200.000.
Eaton, John R., 4,714,991, Cl. 364-200.000.

International Laser Systems, Inc.: *See*—
Adsett, Anthony P., 4,714,107, Cl. 165-16.00A.

International Paper Company: *See*—
Richardson, Paul D., 4,714,191, Cl. 229-121.000.

Intraspec, Inc.: *See*—
Roth, Philip M.; Itskovitch, Nathan M.; and Sussman, Arthur, 4,713,894, Cl. 34-30.000.

Inui, Shuji; and Sano, Yoshio, to Toyoda Gosei Co., Ltd. Steering wheel with tape switch assembly. 4,714,806, Cl. 200-61.550.

Ioannides, Gregor, to Grundig E.M.V. Elektro-Mechanische Versuchsantalt Max Grundig holland.Stiftung & Co. KG. Device for optical turbidity measuring of gases. 4,713,964, Cl. 73-116.000.

Irick, Carl M.: *See*—
Meeker, Gregory W.; Bleck, Norris E.; Rizzi, Marc A.; and Irick, Carl M., 4,714,422, Cl. 425-204.000.

Ishida, Ryuichi: *See*—
Inoue, Ichizo; Oine, Toyonari; Yamada, Yoshihisa; Ishida, Ryuichi; and Ochiai, Takashi, 4,714,702, Cl. 514-259.000.

Ishida, Toru: *See*—
Nakatani, Seiichi; Yuhaku, Satoru; Okinaka, Hideyuki; Ishida, Toru; Makino, Osamu; and Kikuchi, Tatsuro, 4,714,570, Cl. 252-518.000.

Ishige, Yoshiki: *See*—
Kinugasa, Toshiyuki; Furuya, Tamio; Ishige, Yoshiki; Tsuchimoto, Yuichi; and Takahashi, Shoji, 4,714,424, Cl. 425-388.000.

Ishii, Akira, to Kabushiki Kaisha Toshiba. Differential pressure transmission apparatus. 4,713,969, Cl. 73-706.000.

Ishii, Masami: *See*—
Yasuda, Keiji; Oda, Yukihisa; Hamajima, Shigemitsu; Ishii, Masami; Nakanishi, Katsumi; Tsuzuki, Takayoshi; and Tsuda, Jyou, 4,714,804, Cl. 200-11.0DA.

Ishii, Toshihiko: *See*—
Sato, Tadao; and Ishii, Toshihiko, 4,714,599, Cl. 423-290.000.

Ishikawa Gasket Co. Ltd.: *See*—
Udagawa, Tsunekazu, 4,714,260, Cl. 277-235.00B.

Ishikawa Tekko Kabushiki Kaisha: *See*—
Sawada, Kouji; Miura, Kiyokatsu; Suzuki, Keiichiro; Idosako, Hidetaka; and Kazusa, Hideo, 4,714,368, Cl. 403-132.000.

Ishizaki, Akira: *See*—
Eguchi, Masaharu; Tosaka, Yoichi; Ohnuki, Ichiro; Aihara, Yoshihiko; and Ishizaki, Akira, 4,714,332, Cl. 354-21.000.

Ishizuka, Keiji, to Canon Kabushiki Kaisha. Differential phase shift keying demodulator. 4,714,892, Cl. 329-50.000.

Ito, Kojiro: *See*—
Hiroi, Kazuo; and Ito, Kojiro, 4,714,988, Cl. 364-165.000.

Ito, Kuninori: *See*—
Horiki, Seinosuke; Makino, Reiji; Ito, Kuninori; and Unno, Tetsuji, 4,714,633, Cl. 427-282.000.

Ito, Takeo; Takeuchi, Hajime; Hashimoto, Minoru; and Maeda, Tatsumi, to Kabushiki Kaisha Toshiba. Magnetic recording medium. 4,714,654, Cl. 428-328.000.

Ito, Yoichiro, to United States of America, Health and Human Services. Cross-axis synchronous flow-through coil planet centrifuge free of rotary seals: apparatus and method for performing countercurrent chromatography. 4,714,554, Cl. 210-635.000.

Itoh, Kunio; Fukuda, Takeshi; and Yoshioka, Hiroshi, to Shin-Etsu Chemical Co., Ltd. Rubber composition. 4,714,733, Cl. 524-493.000.

Itoh, Satoshi: *See*—
Tanaka, Koichi; and Itoh, Satoshi, 4,715,050, Cl. 375-111.000.

Itou, Masami: *See*—
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,271, Cl. 280-707.000.
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,272, Cl. 280-707.000.

Itskovitch, Nathan M.: *See*—
Roth, Philip M.; Itskovitch, Nathan M.; and Sussman, Arthur, 4,713,894, Cl. 34-30.000.

ITT Aerospace Optical: *See*—
Willems, David A., 4,714,904, Cl. 333-148.000.

Ivins, James M. Water saving float for a water tank. 4,714,088, Cl. 137-426.000.

Iwahashi, Hiroshi, to Kabushiki Kaisha Toshiba. Semiconductor memory device with plural latches for read out. 4,715,017, Cl. 365-239.000.

Iwasaki, Tetsuji, to Kao Corporation. Concretion preventing agent for fertilizers. 4,714,490, Cl. 71-27.000.

Iwasawa, Katsumasa: *See*—
Mochizuki, Takeshi; Iwasawa, Katsumasa; Shiraishi, Ikuya; and Terafuji, Kazuki, 4,714,635, Cl. 427-421.000.

Iwata Air Compressor Mfg. Co., Ltd.: *See*—
Mochizuki, Takeshi; Iwasawa, Katsumasa; Shiraishi, Ikuya; and Terafuji, Kazuki, 4,714,635, Cl. 427-421.000.

Iwata, Kenzi: *See*—
Miyashita, Yoshinobu; Hamanaka, Tadashi; and Iwata, Kenzi, 4,714,675, Cl. 435-32.000.

Iwata, Yasuji: *See*—
Sasaki, Noboru; Iwata, Yasuji; and Mukai, Teruo, 4,713,956, Cl. 72-137.000.

J. I. Case Company: *See*—
Marek, Donald C., 4,714,263, Cl. 280-111.000.

J. Kuhn GmbH Co.: *See*—
Johne, Frank, 4,714,389, Cl. 409-233.000.

Jabarin, Saleh A.: *See*—
Balduff, Dennis C.; and Jabarin, Saleh A., 4,714,741, Cl. 525-185.000.

Jackson, David A.; Corke, Michael; and Kersey, Alan D., to Kent Scientific and Industrial Projects Limited. Fiber optical interferometric temperature sensor with ramp modulation. 4,714,342, Cl. 356-44.000.

Jacobson, David M., to John Fluke Mfg. Co., Inc. Method of and system for fast functional testing of random access memories. 4,715,034, Cl. 371-21.000.

Jacquien, Paul: *See*—
Bianchi, Claude; Fournier, Yves; and Jacquien, Paul, 4,713,882, Cl. 29-727.000.

Jaffre, Robert; and Ropars, Yvon, to Etat Francais. Structure of surface effect ship with side walls. 4,714,041, Cl. 114-67.00A.

Jain, Babu L.; Jain, Pardeep K.; and Briner, Michael S., to Gould Inc. Temperature compensated complementary metal-insulator-semiconductor oscillator. 4,714,901, Cl. 331-176.000.

Jain, Pardeep K.: *See*—
Jain, Babu L.; Jain, Pardeep K.; and Briner, Michael S., 4,714,901, Cl. 331-176.000.

Jakobsson, Leif. Heat accumulator. 4,714,821, Cl. 219-326.000.

Janome Sewing Machine Co., Ltd.: *See*—
Kasuga, Noboru, 4,714,040, Cl. 112-323.000.

Janssen, Bernd: *See*—
Wuesi, Hans-Heiner; Janssen, Bernd; Frickel, Fritz-Frieder; and Nuerrenbach, Axel, 4,714,786, Cl. 568-633.000.

Januschkowetz, Gerhard, to Schiedel GmbH & Co. Intermittently operating sorption apparatus with solid sorbent for heat and cold storage. 4,713,944, Cl. 62-480.000.

Japan Synthetic Rubber Co., Ltd.: *See*—
Hashimoto, Takatsugu; Machara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, 4,714,734, Cl. 524-496.000.

Japp, Robert M.: *See*—
Cummings, Michael J.; Hanford, Donald E.; and Japp, Robert M., 4,714,504, Cl. 156-64.000.

Jeblick, Werner: *See*—
Hurnik, Helmut; Finzenhagen, Manfred; and Jeblick, Werner, 4,714,568, Cl. 252-350.000.

Jefferies, Keith W.; and Long, Murray D., to Allflex International Limited. Liquid flow sensing device. 4,714,048, Cl. 119-14.080.

Jeffers, Frederick J.: *See*—
McClure, Richard J.; and Jeffers, Frederick J., 4,714,324, Cl. 350-362.000.

Jenab, S. Abdollah. Hillslope landslide stability drain. 4,714,376, Cl. 405-45.000.

Jenkins, Vaughn J.: *See*—
Wilson, Bart A.; Jenkins, Vaughn J.; and Fonnesbeck, Dale D., 4,714,837, Cl. 307-289.000.

Jennens, Eric G. Inshore submersible amphibious machines. 4,713,896, Cl. 37-54.000.

Jennings, Ralph N., to Triad Metal Products Company. Reuseable clamp with an outwardly projecting ear on each opposing end and having a hook shaped projection on one ear adapted for interlocking coaction with an opening in the other ear. 4,713,863, Cl. 24-20.00R.

JEOL, Ltd.: *See*—
Nagayama, Kuniaki, 4,714,882, Cl. 324-307.000.

Jim Walter Resources, Inc.: *See*—
Londrigan, Michael E.; and Skowronski, Michael J., 4,714,717, Cl. 521-131.000.

Joader, Stefan: *See*—
Schreurs, Emile; Joader, Stefan; and Valdemarsson, Stefan, 4,714,974, Cl. 361-12.000.

Jodelet, Francois: *See*—
Abondance, Roger; Corbet, Pierre; Jodelet, Francois; and Andre, Jean-Francois, 4,714,267, Cl. 280-615.000.

Johannes, Wilhelmus. Device for determining the velocity in a flowing fluid by use of the acoustic Doppler-effect. 4,713,971, Cl. 73-861.250.

Johansson, Lars A.: *See*—
Wallin, Per Olov T.; Warell, Bengt H.; Svensson, Ake P.; Lundstrom, Kurt A.; and Johansson, Lars A., 4,714,025, Cl. 108-20.000.

John Fluke Mfg. Co., Inc.: *See*—
Jacobson, David M., 4,715,034, Cl. 371-21.000.
Jones, Wayne R., 4,714,436, Cl. 439-497.000.

John, Gunter; Kretschmer, Karl-Heinz; and Rollich, Jurgen, to VEB Kombinat Fortschritt Landmaschinen. Impeller-type cutter drum for a chopper. 4,714,204, Cl. 241-55.000.
Johne, Frank, to J. Kuhn GmbH Co. Tool holder. 4,714,389, Cl. 409-233.000.
Johns Hopkins University, The: *See*—
Civin, Curt I., 4,714,680, Cl. 435-240.250.
Johnson, Dale B.: *See*—
DeHart, Marvin L.; and Johnson, Dale B., 4,714,009, Cl. 98-40.130.
Johnson, Gilbert L., Jr.: *See*—
McMahon, Donald H.; and Johnson, Gilbert L., Jr., 4,715,028, Cl. 370-3.000.
Johnson, Joel W.: *See*—
Healy, John T.; and Johnson, Joel W., 4,714,031, Cl. 110-109.000.
Johnson, Ralph E.; and Rodda, Donald, to Singer Company, The. Needle looper assembly for non-threaded needle lockstitching. 4,714,037, Cl. 112-184.000.
Johnson, Wayne J.: *See*—
Crawford, Robert D.; Johnson, Wayne J.; Kimber, Theo, Jr.; Nolff, Douglas; Volk, Jack R.; and Franks, Donald C., 4,715,031, Cl. 370-85.000.
Johnson, William G.; and Romagnoli, Gary B. Container for disposable expended medical supplies. 4,714,168, Cl. 220-1.00T.
Jones, Jamieson B. Fuel additive proportioning apparatus and method. 4,714,087, Cl. 137-3.000.
Jones, Lloyd G., to Mobil Oil Corporation. Use of a proppant with controlled pulse fracturing. 4,714,114, Cl. 166-280.000.
Jones, Robert L., to NDT Instruments, Inc. Hand-held digital thickness gage. 4,715,008, Cl. 364-563.000.
Jones, Wayne R., to John Fluke Mfg. Co., Inc. Test clip with grounding adaptor for cable connector. 4,714,436, Cl. 439-497.000.
Joppien, Hartmut: *See*—
Franke, Heinrich; Joppien, Hartmut; and Franke, Helga, 4,714,710, Cl. 514-430.000.
Jordan, Robert D. Fuel injector system. 4,714,066, Cl. 123-447.000.
Jordan, Willie W.: *See*—
McEachern, Richard D.; Jordan, Willie W.; Gebheim, Gerald C.; and Robinson, Joe M., 4,714,196, Cl. 239-62.000.
Jorgensen, Diane V.; Kennedy, Clinton R.; and Wong, Stephen S., to Mobil Oil Corporation. Process for cyclic dewaxing/regeneration of hydrocarbon feedstocks. 4,714,537, Cl. 208-111.000.
Joshua, Henry: *See*—
Miller, Douglas K.; and Joshua, Henry, 4,714,711, Cl. 514-464.000.
Jova Enterprises, Inc.: *See*—
Gerling, John E.; and Ren, Ji T., 4,714,811, Cl. 219-10.55F.
Juhl, Roger L.; Potter, James L.; and Polemenakos, Sotiros C., to Dow Chemical Company, The. Stable polyamide solutions. 4,714,736, Cl. 524-608.000.
Jumel, Bernard: *See*—
Focqueur, Herve ; and Jumel, Bernard, 4,714,448, Cl. 464-68.000.
Jung, Alfred K.; Silberberg, Joseph; and Weil, Edward D., to Stauffer Chemical Company. Dibromoneopentyl phosphate melamine salt flame retardant. 4,714,724, Cl. 524-100.000.
Junghans Uhren GmbH: *See*—
Ganter, Wolfgang, 4,714,352, Cl. 368-64.000.
Jungverdorben, Hermann-Josef: *See*—
Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Dross, Joachim; and Jungverdorben, Hermann-Josef, 4,714,045, Cl. 118-420.000.
Jupp, Jeffrey A.; and Rees, Peter H., to British Aerospace PLC. Aircraft wing and winglet arrangement. 4,714,215, Cl. 244-199.000.
Juri, Pedro N.: *See*—
Feld, Thomas A.; Juri, Pedro N.; and Treher, Elizabeth N., 4,714,605, Cl. 424-1.100.
K & L Microwave: *See*—
Bernstein, Richard; Anthony, William H.; and Lupfer, David A., 4,714,905, Cl. 333-167.000.
Kabasawa, Satoshi; Hsieh, Ming-Shiun; Chang, Shih-Ming; and Lin, Chun-Hong, to Matsushita Electric Industrial Co., Ltd. Pattern recognition system. 4,715,004, Cl. 364-513.500.
Kabushiki Kaisha Daikin Seisakusho: *See*—
Ohkubo, Masahiro, 4,713,984, Cl. 74-732.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.
Kabushiki Kaisha Toshiba: *See*—
Hiroi, Kazuo; and Ito, Kojiro, 4,714,988, Cl. 364-165.000.
Ichikawa, Kentaro, 4,714,402, Cl. 415-35.000.
Ishii, Akira, 4,713,969, Cl. 73-706.000.
Ito, Takeo; Takeuchi, Hajime; Hashimoto, Minoru; and Maeda, Tatsumi, 4,714,654, Cl. 428-328.000.
Iwahashi, Hiroshi, 4,715,017, Cl. 365-239.000.
Onitsuka, Naganori, 4,714,869, Cl. 322-20.000.
Rokugawa, Kyuji; and Tamayama, Yasuko, 4,714,672, Cl. 435-7.000.
Takenaka, Shigeo; Kamohara, Eiji; and Nishimura, Takashi, 4,714,856, Cl. 313-2.100.
Tanaka, Koichi; and Itoh, Satoshi, 4,715,050, Cl. 375-111.000.
Kabushiki Kaisya Advance Kaihatsu Kenkyujo: *See*—
Ando, Shimon, 4,713,985, Cl. 74-804.000.
Kabushikikaisha Kotobuki: *See*—
Kageyama, Hidehei; and Kuwabara, Yukimasa, 4,714,365, Cl. 401-65.000.
Kadash, Marjory A.; and Schwab, Frederick C., to Mobil Oil Corporation. Method for treating polymer surfaces by corona discharge and then with reducing agent and resulting article. 4,714,658, Cl. 428-523.000.
Kafkis, N. H. Method and apparatus for filling a plurality of flexible pipette type vessels. 4,713,925, Cl. 53-432.000.
Kafko Manufacturing Limited: *See*—
Kindness, William, 4,713,849, Cl. 4-496.000.
Kageyama, Akira: *See*—
Oda, Hiroyuki; and Kageyama, Akira, 4,714,058, Cl. 123-90.220.
Kageyama, Hidehei; and Kuwabara, Yukimasa, to Kabushikikaisha Kotobuki. Mechanical pencil. 4,714,365, Cl. 401-65.000.
Kajiyama, Kouji: *See*—
Ueda, Kazuhiro; Yamaguchi, Toshiaki; Kajiyama, Kouji; and Matsumoto, Osamu, 4,714,089, Cl. 137-614.180.
Kajs, Theresa M.; and Berge, Cynthia A., to Procter & Gamble Company, The. Antimicrobial toilet bars. 4,714,563, Cl. 252-107.000.
Kali-Chemie Pharma GmbH: *See*—
Thies, Peter W.; David, Samuel; Kuehl, Ulrich; Buschmann, Gerd; and Flecker, Peter, 4,714,709, Cl. 514-414.000.
Kamata, Yutaka: *See*—
Uneno, Tsunchisa; Kamata, Yutaka; and Miyazaki, Sinji, 4,714,668, Cl. 430-316.000.
Kamaya, Masashi, to PIAA Corporation. Mounting device for fog lamp. 4,714,223, Cl. 248-291.000.
Kamio, Masaru: *See*—
Yokono, Koujiro; Kamio, Masaru; and Ohkubo, Yukitoshi, 4,714,636, Cl. 428-1.000.
Kamm, Bodo: *See*—
Hahn, Alfred; Kamm, Bodo; Weiss, Karl; and Dummert, Johannes, 4,715,057, Cl. 378-197.000.
Kamohara, Eiji: *See*—
Takenaka, Shigeo; Kamohara, Eiji; and Nishimura, Takashi, 4,714,856, Cl. 313-2.100.
Kanbe, Junichiro: *See*—
Katagiri, Kazuharu; Yoshinaga, Kazuo; Okada, Shinjiro; and Kanbe, Junichiro, 4,714,323, Cl. 350-350.00S.
Kanemitsu, Shinji: *See*—
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,714,337, Cl. 355-3.0DR.
Kanno, Hideo; Yamashita, Shinichi; Enari, Masahiko; Kuno, Mitsutoshi; and Mizutome, Atsushi, to Canon Kabushiki Kaisha. Display panel and method of driving the same. 4,714,921, Cl. 340-784.000.
Kanojia, Ramesh M.; Falotico, Robert; Tobia, Alfonso J.; and Press, Jeffery B., to Ortho Pharmaceutical Corporation. 4-nitrogen substituted isoquinolinol compounds having cardiotonic, phosphodiesterase fraction III inhibiting properties and/or renal vasodilating properties. 4,714,705, Cl. 514-309.000.
Kantrud, Steven G.; Ericson, Steven V.; and Seidel, Karl R., Jr., to Micro Component Technology, Inc. Drop shuttle. 4,714,150, Cl. 198-463.300.
Kao, Anthony H. Preparing naturally sweet yogurt with Saccharomycopsis sp. and Rhizopus spp. 4,714,616, Cl. 426-42.000.
Kao Corporation: *See*—
Dohzono, Masatake; Miyashita, Iwao; and Abe, Norihiro, 4,714,466, Cl. 604-378.000.
Iwasaki, Tetsuji, 4,714,490, Cl. 71-27.000.
Yamasaki, Harumasa; Morii, Masayoshi; Yokota, Yukinaga; Mamada, Akira; and Nabata, Yoshiyuki, 4,714,719, Cl. 521-163.000.
Kapany, Narinder S.; and Unterleitner, Fred C., to Kaptron, Inc. Star coupler for optical fibers. 4,714,313, Cl. 350-96.160.
Kaplinsky, George T., to Hewlett-Packard Company. Ink delivery system. 4,714,937, Cl. 346-140.00R.
Kaptron, Inc.: *See*—
Kapany, Narinder S.; and Unterleitner, Fred C., 4,714,313, Cl. 350-96.160.
Karnopp, Dean: *See*—
Heess, Gerhard; Karnopp, Dean; and van Zanten, Anton, 4,714,300, Cl. 303-115.000.
Kasama, Nobuhiro: *See*—
Inoue, Yutaka; Kurata, Mitsuru; Kasama, Nobuhiro; Hosaka, Masao; Yagasaki, Toshiaki; Tanioka, Hiroshi; and Yamakawa, Tadashi, 4,714,940, Cl. 355-3.00R.
Kass, Lawrence, to Cytocolor Incorporated. Method of staining and identifying cells and compositions thereof. 4,714,606, Cl. 424-3.000.
Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. Baby carriage wheel stopping device. 4,714,141, Cl. 188-20.000.
Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. Steering wheel fixing construction for toy vehicles. 4,714,261, Cl. 280-7.100.
Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. Baby carriage. 4,714,292, Cl. 297-437.000.
Kassik, Ronald W.: *See*—
Deem, Jake O.; Kassik, Ronald W.; and Metteer, N. Bruce, 4,715,001, Cl. 364-484.000.
Kast, Steven J., to United States of America, Energy. Interlocking egg-crate type grid assembly. 4,714,585, Cl. 376-442.000.
Kasuga, Noboru, to Janome Sewing Machine Co., Ltd. Sewing machine four motion speed. 4,714,040, Cl. 112-323.000.
Katagiri, Kazuharu; Yoshinaga, Kazuo; Okada, Shinjiro; and Kanbe, Junichiro, to Canon Kabushiki Kaisha. Ferroelectric liquid crystal device having chiral smectic and nematic liquid crystal composition. 4,714,323, Cl. 350-350.00S.
Kataoka, Yoshiharu: *See*—
Oda, Kazuyuki; Yui, Yoshikiyo; Kataoka, Yoshiharu; and Hata, Hideo, 4,714,331, Cl. 353-122.000.

Kato, Minoru: *See*—
Nishimura, Ryuji; Kato, Minoru; Noda, Masaru; and Imaide, Takuya, 4,714,955, Cl. 358-48.000.

Kato, Yasuo; Harada, Kunio; Kubota, Shigeo; Watanabe, Yoshio; and Murayama, Seiichi, to Hitachi, Ltd. Plasma x-ray source. 4,715,054, Cl. 378-122.000.

Kato, Yoshitake; Fujita, Minoru; and Maruyama, Hiroshi, to Hitachi Maxell, Ltd. Shutter assembly for use in a disc cartridge. 4,714,973, Cl. 360-133.000.

Kaufman, Christopher: *See*—
Dowd, Paul; Kaufman, Christopher; and Abeles, Robert H., 4,714,777, Cl. 562-506.000.

Kaun, Thomas D.; and Smith, James L., to United States of America, Energy. Molten carbonate fuel cell. 4,714,661, Cl. 429-14.000.

Kawada, Kazuhiro: *See*—
Fukushima, Koji; Seto, Yoshiko; Kawada, Kazuhiro; Toi, Koji; and Kumashiro, Izumi, 4,714,713, Cl. 514-563.000.

Kawada, Shigeki; Amemiya, Yoichi; Sogabe, Masatoyo; and Kumagai, Kazushi, to Fanuc Ltd. Permanent-magnet field synchronous motor. 4,714,852, Cl. 310-156.000.

Kawaguchi, Katsuji: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yasutaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.

Kawaguchi, Takeshi: *See*—
Shinozaki, Takashi; and Kawaguchi, Takeshi, 4,714,126, Cl. 180-233.000.

Kawai, Masao: *See*—
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,713,988, Cl. 74-868.000.
Hayakawa, Yoichi; Kawai, Masao; Nishikawa, Seiichi; and Fukumura, Kagenori, 4,713,989, Cl. 74-869.000.

Kawai Musical Instrument Mfg. Co., Ltd: *See*—
Deutsch, Ralph, 4,713,997, Cl. 84-1.220.

Kawai, Takashi: *See*—
Nakanishi, Yutaka; Yamada, Toshihiko; Sanada, Yuji; and Kawai, Takashi, 4,714,426, Cl. 431-132.000.

Kawajiri, Kazuhiro; Tamura, Hiroshi; Shinada, Haruji; Saito, Mitsuo; and Mizobuchi, Yuzo. Solid-state photo sensor device. 4,714,950, Cl. 357-30.000.

Kawakita, Tetsuya: *See*—
Tanaka, Kiyoshi; Saeki, Masaru; Matsuishi, Tsutomu; Koga, Yoshihiro; and Kawakita, Tetsuya, 4,714,767, Cl. 548-344.000.

Kawano, Hiroshige, to Nakamura Koki Co., Ltd. Bladder type fluid accumulator for hydraulic system. 4,714,093, Cl. 138-30.000.

Kawashima, Akihiro: *See*—
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.

Kawasumi Laboratories, Inc.: *See*—
Kawasumi, Shinroku, 4,714,645, Cl. 428-209.000.

Kawasumi, Shinroku, to Mitsubishi Mining & Cement Co., Ltd.; and Kawasumi Laboratories, Inc. Electronic parts and process for the manufacture of the same. 4,714,645, Cl. 428-209.000.

Kay, D. Alan R.; and Wilson, William G. Methods of desulfurizing gases. 4,714,598, Cl. 423-230.000.

Kazami, Kazuyuki; Nakamura, Toshiyuki; and Wakabayashi, Hiroshi, to Nippon Kogaku K. K. Warning apparatus for camera. 4,714,938, Cl. 354-173.100.

Kazusa, Hideo: *See*—
Sawada, Kouji; Miura, Kiyokatsu; Suzuki, Keiichiro; Idosako, Hidetaka; and Kazusa, Hideo, 4,714,368, Cl. 403-132.000.

Kearns, John J.: *See*—
Tremblay, Paul A.; and Kearns, John J., 4,714,571, Cl. 260-403.000.

Keenan, Daniel J.; and Hoss, Donald A., to Chrysler Motors Corporation. Collapsible/expandable shipping rack. 4,714,169, Cl. 220-8.000.

Keene, Harold J.: *See*—
Dusel, Robert O.; Keene, Harold J.; Berres, James; and Blaha, Gerald, 4,713,880, Cl. 29-564.400.

Keil, John P.: *See*—
Sisk, George W.; Lynn, Shelby A.; Keil, John P.; and Woods, John T., 4,714,304, Cl. 312-214.000.

Keiper Recaro GmbH & Co.: *See*—
Cremer, Heinz P.; Wolsiefer, Harald; Hoffmann, Manfred; Deegener, Elmar; and Franzmann, Gunter, 4,713,986, Cl. 74-805.000.

Keith, William C., to Texas Instruments Incorporated. Linear drive motor with symmetric magnetic fields for a cooling system. 4,713,939, Cl. 62-6.000.

Kejr, Melvin P. Vehicle for transporting elongated objects. 4,714,273, Cl. 280-789.000.

Keklak, Ronald; Couture, Michael V.; and Whitehouse, John C. Safe utility knife. 4,713,885, Cl. 30-162.000.

Kelber, John D. Leaf collection apparatus for blower-vacuums. 4,713,858, Cl. 15-347.000.

Keller AG fur Druckmesstechnik: *See*—
Keller, Hans W.; and Von Ritter, Michael, 4,715,003, Cl. 364-571.000.

Keller, Hans W.; and Von Ritter, Michael, to Keller AG fur Druckmesstechnik. Method for temperature compensation and measuring circuit therefor. 4,715,003, Cl. 364-571.000.

Kelly, George G.; McLaughlin, Henry; and Simon, James R., to CXA Ltd./CXA LTEE. Pyrotechnic variable delay connector. 4,714,017, Cl. 102-275.300.

Kemeny, George A., to Westinghouse Electric Corp. Electromagnetic launcher with a passive inductive loop for rail energy retention or dissipation. 4,714,003, Cl. 89-8.000.

Kemler, Craig G.: *See*—
Covert, Charles H.; Gifford, William E.; Kemler, Craig G.; and Paddock, Gordon R., 4,714,485, Cl. 55-189.000.

Kenna, Robert V., to Pfizer Hospital Products Group, Inc. Spinal implant. 4,714,469, Cl. 623-17.000.

Kennedy, Clinton R.: *See*—
Jorgensen, Diane V.; Kennedy, Clinton R.; and Wong, Stephen S., 4,714,537, Cl. 208-111.000.

Kent Scientific and Industrial Projects Limited: *See*—
Jackson, David A.; Corke, Michael; and Kersey, Alan D., 4,714,342, Cl. 356-44.000.

Kerdraon, Alain: *See*—
Chaumeau, Alain; Crotet, Eric; Kerdraon, Alain; and Ragonnet, Jean-Paul, 4,714,022, Cl. 102-476.000.

Kergomard, Jean; and Meynial, Xavier, to Centre National de la Recherche Scientifique; and Institut de Recherche et de Coordination Acoustique Musique IRCAM. Device for obtaining quarter-tones and other micro-intervals on musical wind instruments with lateral holes. 4,714,001, Cl. 84-386.000.

Kerivan, Leo J.: *See*—
Hubbard, Leo J.; and Kerivan, Leo J., 4,714,185, Cl. 226-74.000.

Kernforschungsanlage Julich GmbH: *See*—
Haubold, Heinz-Gunter; and Hiller, Peter, 4,714,961, Cl. 358-209.000.

Kernforschungszentrum Karlsruhe GmbH: *See*—
Hofmann, Albert, 4,713,942, Cl. 62-62.000.

Kersey, Alan D.: *See*—
Jackson, David A.; Corke, Michael; and Kersey, Alan D., 4,714,342, Cl. 356-44.000.

Kersten, Reinhard: *See*—
Braun, Walter; Kersten, Reinhard; and Kuhl, Egbert, 4,714,822, Cl. 219-449.000.

Kessler, Manfred; and Hoper, Jens. Method for measurement of concentration of substance. 4,714,673, Cl. 435-14.000.

Kesteloot, Raymond P., to R K W Industries, Inc. Composite engine. 4,714,060, Cl. 123-195.00R.

Ketley, Celia H., to W. R. Grace & Co. Low temperature single step curing polyimide adhesive. 4,714,726, Cl. 524-11.000.

Kett Electric Laboratory: *See*—
Fujita, Toshio; and Hasegawa, Kouzi, 4,715,007, Cl. 364-563.000.

Ketzler, John H. A., to ETA Systems, Inc. Electronic clock tuning system. 4,714,924, Cl. 340-825.210.

Keutgen, Franz; Kubon, Achim; Perings, Dieter; Stadler, Peter; Voss-Spilker, Peter; and Apel, Karl-Hermann, to Mannesmann AG. Machine for continuous, multistrand casting in the horizontal. 4,714,105, Cl. 164-420.000.

Keyes, Melvin H., to Owens-Illinois Glass Container Inc. Protein modification to provide enzyme activity. 4,714,676, Cl. 435-176.000.

Keyes, Melvin H., to Owens-Illinois Glass Container Inc. Protein modification to provide enzyme activity. 4,714,677, Cl. 435-183.000.

Khachaturian, Jon E. Method and apparatus for the offshore installation of multi-ton prefabricated deck packages on partially submerged offshore jacket foundations. 4,714,382, Cl. 405-204.000.

Khare, Ashok K., to National Forge Company. Process for producing large section, large mass forged sleeves from large diameter ingots of alloy 625. 4,714,498, Cl. 148-11.50N.

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Khobaib, Mohammad: *See*—
Lynch, Charles T.; Vahldick, Fred W.; and Khobaib, Mohammad, 4,714,564, Cl. 252-110.000.

Khowaylo, Alex: *See*—
Averill, Robert G.; Khowaylo, Alex; and Sidebotham, Christopher G., 4,714,472, Cl. 623-20.000.

Kiesel, Helmut; and Stoeckl, Klaus, to Siemens Aktiengesellschaft. Bracket structure for dental purposes. 4,714,222, Cl. 248-282.000.

Kikuchi, Seiji: *See*—
Akiba, Yasuhiro; Namba, Masato; Kikuchi, Seiji; and Soejima, Hidenobu, 4,714,850, Cl. 310-49.00R.

Kikuchi, Tatsuro: *See*—
Nakatani, Seiichi; Yuhaku, Satoru; Okinaka, Hideyuki; Ishida, Toru; Makino, Osamu; and Kikuchi, Tatsuro, 4,714,570, Cl. 252-518.000.

Kikuchi, Uhee; and Takeo, Tadashi, to Honda Giken Kogyo Kabushiki Kaisha. Painting apparatus for vehicle body. 4,714,044, Cl. 118-314.000.

Kimber, Theo, Jr.: *See*—
Crawford, Robert D.; Johnson, Wayne J.; Kimber, Theo, Jr.; Nolff, Douglas; Volk, Jack R.; and Franks, Donald C., 4,715,031, Cl. 370-85.000.

Kimberly-Clark Corporation: *See*—
Shipp, Peter W., Jr.; and Vogt, Clifford M., 4,714,647, Cl. 428-212.000.

Kimizima, Kazuo: *See*—
Ouchi, Yutaka; Sugino, Akio; Sugaya, Kazuo; and Kimizima, Kazuo, 4,714,104, Cl. 164-504.000.

Kinaga, Eiichi; and Shiraishi, Daiichi, to Toyota Jidosha Kabushiki Kaisha. Side door hinge mechanism in motor vehicle. 4,713,862, Cl. 16-223.000.

Kindness, William, to Kafko Manufacturing Limited. Pool liner retainer with closure clip. 4,713,849, Cl. 4-496.000.

King, William W., to Hughes Tool Company. Diamond drill bit with co-joined cutters. 4,714,120, Cl. 175-329.000.
Kinsman, Donald V.: *See*—
Luken, Clement H., Jr.; and Kinsman, Donald V., 4,714,496, Cl. 106-270.000.
Kinugasa, Toshiyuki; Furuya, Tamio; Ishige, Yoshiki; Tsuchimoto, Yuichi; and Takahashi, Shoji, to Honda Giken Kogyo Kabushiki Kaisha. Vacuum mold. 4,714,424, Cl. 425-388.000.
Kioritz Corporation: *See*—
Hironaka, Yoshiaki, 4,714,447, Cl. 464-52.000.
Kirner, John F.: *See*—
Cabrera, Alejandro L.; Kirner, John F.; Miller, Robert A.; and Pierantozzi, Ronald, 4,714,632, Cl. 427-255.100.
Kishida, Yoshifumi; and Takeuchi, Masayoshi, to Sharp Corporation; and Dainichi Shoji Co., Ltd. Apparatus for washing and drying substrates. 4,714,086, Cl. 134-83.000.
Kishimoto, Keiichi: *See*—
Iida, Kazumi; Ohata, Yosuke; Hyodo, Keiichiro; Akiyama, Kazunori; Umeda, Tadashi; and Kishimoto, Keiichi, 4,714,338, Cl. 355-3.0FU.
Kisida, Hirosi; Nishida, Sumio; and Hatakoshi, Makoto, to Sumitomo Chemical Company, Limited. Pyridyloxy derivatives and their use as insecticides. 4,714,706, Cl. 514-345.000.
Kitamura, Koichi; Swartz, Louis D.; Catchpole, Clive; and Yaniv, Zvi, to Ovonic Imaging Systems, Inc. Photosensitive pixel with exposed blocking element. 4,714,836, Cl. 250-578.000.
Kitamura, Koichiro, to Kitamura Machinery Co., Ltd. XY table. 4,713,887, Cl. 33-1.00M.
Kitamura Machinery Co., Ltd.: *See*—
Kitamura, Koichiro, 4,713,887, Cl. 33-1.00M.
Kitazumi, Etsuo: *See*—
Takeuchi, Makoto; Kitazumi, Etsuo; Sakaki, Hirokazu; and Okishi, Yoshio, 4,714,528, Cl. 204-33.000.
Kiya, Nobuyuki; and Yoshino, Motoaki, to Fanuc Ltd. Numerical control method. 4,714,999, Cl. 364-474.000.
Kiyoshige, Tatsuo: *See*—
Nakamura, Tsuneaki; Kiyoshige, Tatsuo; and Sasaki, Shuji, 4,714,612, Cl. 424-85.000.
Klassen, Amelia K., legal representative: *See*—
Young, Leon; and Klassen, Edward J., deceased, 4,714,184, Cl. 224-253.000.
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Klaveness, Jo, to Nycomed AS. NMR contrast agents. 4,714,607, Cl. 424-9.000.
Klein, Gerald B.: *See*—
Wells, Virginia J.; and Klein, Gerald B., 4,713,901, Cl. 40-360.000.
Klein, Klaus W.: *See*—
Bocker, Jurgen; Klein, Klaus W.; Gersbach, Klaus; Sauvestre, Jean-Claude; and Montier, Patrick, 4,714,024, Cl. 102-521.000.
Kleinschmit, Peter: *See*—
Strack, Hans; and Kleinschmit, Peter, 4,714,690, Cl. 502-64.000.
Knight, David J.: *See*—
Koening, James P.; Knight, David J.; Szudy, James E.; Bartholomew, Roy E.; and Wurst, William R., 4,714,483, Cl. 55-163.000.
Knoblauch, Richard: *See*—
Szodfridt, Imre; and Knoblauch, Richard, 4,714,147, Cl. 192-87.150.
Kobayashi, Fumiaki, to Toyota Jidosha Kabushiki Kaisha. Method and system for detecting fuel injection timing in a diesel engine. 4,713,965, Cl. 73-119.00A.
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Moroto, Shuzo; Sumiya, Koji; Watanabe, Kazuaki; Kubo, Seitoku; Kobayashi, Koji; and Taga, Yutaka, 4,714,146, Cl. 192-85.0AA.
Kobayashi, Mitsuru: *See*—
Miyazawa, Hideo; Andoh, Ikuhiro; Koyama, Hiromichi; and Kobayashi, Mitsuru, 4,714,306, Cl. 439-395.000.
Koblitz, Francis F.; and Snyder, Lynn K., to AMP Incorporated. Sealant composition. 4,714,801, Cl. 174-88.00R.
Koch, Steven R.; Stein, Charles R.; Hatfield, William T.; Shapiro, Neil R.; and Hughes, William C., to General Electric Company. Local area network bridge. 4,715,030, Cl. 370-85.000.
Koening, James P.; Knight, David J.; Szudy, James E.; Bartholomew, Roy E.; and Wurst, William R., to Allied Corporation. Air dryer purge control for turbocharged compressors. 4,714,483, Cl. 55-163.000.
Koga, Yoshihiro: *See*—
Tanaka, Kiyoshi; Saeki, Masaru; Matsuishi, Tsutomu; Koga, Yoshihiro; and Kawakita, Tetsuya, 4,714,767, Cl. 548-344.000.
Kogan, Marcelo; Dinizo, Stephen E.; and Fancher, Llewellyn W., to Stauffer Chemical Company. Isothiourea herbicidal composition. 4,714,493, Cl. 71-99.000.
Koglin, Bernd: *See*—
Bender, Wolfgang; Mrotzek, Dieter; Koglin, Bernd; and Steiner, Karl-Heinz, 4,714,456, Cl. 494-36.000.
Koizumi, Hideharu: *See*—
Ohkuma, Kuniaki; Nakagawa, Reiji; Miyao, Hisao; Yoshimura, Shinichi; Suzuki, Toshio; Hayashi, Toyoaki; Arakawa, Masayasu; and Koizumi, Hideharu, 4,714,397, Cl. 414-222.000.
Koizumi, Susumu: *See*—
Watanabe, Seiji; Horimoto, Teiji; and Koizumi, Susumu, 4,714,155, Cl. 198-619.000.
Koken Co., Ltd.: *See*—
Namiki, Tetsuro; Furuse, Masayasu; Kuroyanagi, Yoshimitsu; and Miyata, Teruo, 4,714,758, Cl. 530-354.000.
Kolar Arms: *See*—
Mainland, Donald R., 4,713,903, Cl. 42-79.000.
Kolomayets, George; Ryan, Allen; Nieto, Augustine; and Andrus, Bryan, to Bally Manufacturing Corporation. Rowing machine with improved mechanical features. 4,714,244, Cl. 272-72.000.
Kolton, Chester; and Spater, Stuart S., to B&G Plastics, Inc. Hanger for suspenders. 4,714,156, Cl. 206-296.000.
Komanduri, Ranga, to General Electric Company. Polycrystalline diamond and CBN cutting tools. 4,714,385, Cl. 407-119.000.
Komet Stahlhalter und Werkzeugfabrik Robert Breuning GmbH: *See*—
Eckle, Otto; and Roser, Walter, 4,714,390, Cl. 409-234.000.
Kong, Samuel K., to Advanced Micro Devices, Inc. Three-voltage level detector for indicating a high level, mid-level or low level voltage. 4,714,877, Cl. 324-133.000.
Konrath, Karl: *See*—
Bohringer, Wilfried; Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, 4,714,412, Cl. 417-289.000.
Kordomenos, Panagiotis I.; and Dervan, Andrew H., to Du Pont de Nemours, E. I., and Company. Epoxy-polyester graft copolymers suitable for chip resistant coating composition I. 4,714,743, Cl. 525-418.000.
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Kornrumpf, William P.: *See*—
Harnden, John D., Jr.; Kornrumpf, William P.; and Farrall, George A., 4,714,847, Cl. 310-332.000.
Korsky, Vincent V.; and Pajer, Raymond T., to TIE/communications, Inc. Speakerphone control circuit having low gain states and method for controlling gain of speakerphone. 4,715,062, Cl. 379-390.000.
Koss, Richard E. Basketball return device. 4,714,248, Cl. 273-1.50A.
Koster, Marinus P.; Soemers, Hermanus M. J. R.; and Dona, Marinus J. J., to U.S. Philips Corporation. Friction-disk transmission comprising a tiltable disk. 4,713,977, Cl. 74-191.000.
Koya, Hirokuni, to Toshiba Machine Co., Ltd. Casting method and an apparatus therefor. 4,714,102, Cl. 164-457.000.
Koyama, Hiromichi: *See*—
Miyazawa, Hideo; Andoh, Ikuhiro; Koyama, Hiromichi; and Kobayashi, Mitsuru, 4,714,306, Cl. 439-395.000.
Kozlowski, Thomas A.; Lindstrom, Robert O.; Loughrin, Thomas D.; and Baka, Kathleen J., to Durkee Industrial Foods Corp. Condiment bottle cap. 4,714,181, Cl. 222-480.000.
Kramer, Felix, to Elpatronic AG. Welding machine for welding tongues onto sheet-metal members. 4,714,814, Cl. 219-79.000.
Krause, Bernd, to Siemens Aktiengesellschaft. Holding and testing device for electronic modules within flat carriers. 4,714,879, Cl. 324-158.00F.
Krause, Dieter, to Siemens Aktiengesellschaft. Method for connecting elements of optical communication technology to one another or to elements of releasable plug connections. 4,714,315, Cl. 350-96.200.
Krauter, Allan I.; and Vivenzio, Robert L., to Welch Allyn, Inc. Biopsy channel for endoscope. 4,714,075, Cl. 128-4.000.
Krauth, Axel: *See*—
Heinrich, Juergen; Krauth, Axel; Victor, Karl-Heinz; and Peeken, Heinz, 4,714,257, Cl. 277-1.000.
Kraver, Theodore C.: *See*—
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Kravitz, Stanley H.: *See*—
Andrews, George E.; Davis, Paul C.; Farley, Dennis C.; Kravitz, Stanley H.; Meeker, Thrygve R.; Petersen, Owe G.; and Schelling, Arthur W., 4,715,049, Cl. 375-106.000.
Krebs, Thierry: *See*—
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Kremer, Ross A.: *See*—
Driscoll, Patrick R.; and Kremer, Ross A., 4,714,600, Cl. 423-319.000.
Kretschmer, Karl-Heinz: *See*—
John, Gunter; Kretschmer, Karl-Heinz; and Rollich, Jurgen, 4,714,204, Cl. 241-55.000.
Kricsfalussy, Zoltan: *See*—
Stammann, Gunter; Kricsfalussy, Zoltan; Waldmann, Helmut; Schneider, Joachim; and Medem, Harald, 4,714,689, Cl. 502-54.000.
Krimmer, Roland: *See*—
Lechner, Robert; Rudolf, Hans-Werner; and Krimmer, Roland, 4,715,058, Cl. 379-27.000.
Kroll, Karl J. F.: *See*—
Kroll, William P.; Kroll, Robert E. K.; Kroll, Mark W.; and Kroll, Karl J. F., 4,714,121, Cl. 177-134.000.
Kroll, Mark W.: *See*—
Kroll, William P.; Kroll, Robert E. K.; Kroll, Mark W.; and Kroll, Karl J. F., 4,714,121, Cl. 177-134.000.
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Kroll, William P.; Kroll, Robert E. K.; Kroll, Mark W.; and Kroll, Karl J. F. Wheel scale assembly. 4,714,121, Cl. 177-134.000.
Krommer, Helmut; Neuhauser, Karl-Heinz; and Weiss, Stefan. Process for the preparation of solid sodium hydrogen cyanamide. 4,714,602, Cl. 423-369.000.

Kruger, Robert J.: *See*—
Anthony, Jack; Bilstad, Arnold C.; Leblong, Wayne T.; and Kruger, Robert J., 4,714,595, Cl. 422-294.000.
Krul, William R., to Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, The. In vitro propagation of grape. 4,714,679, Cl. 435-240.480.
Krupp Stahl AG: *See*—
Heller, Wilhelm; Flugge, Jurgen; and Ratz, Gerhard, 4,714,500, Cl. 148-12.00R.
Kubo, Seitoku: *See*—
Moroto, Shuzo; Sumiya, Koji; Watanabe, Kazuaki; Kubo, Seitoku; Kobayashi, Koji; and Taga, Yutaka, 4,714,146, Cl. 192-85.0AA.
Kubon, Achim; and Voss-Spilker, Peter, to Mannesmann AG. Method of horizontal continuous casting. 4,714,106, Cl. 164-484.000.
Kubon, Achim: *See*—
Keutgen, Franz; Kubon, Achim; Perings, Dieter; Stadler, Peter; Voss-Spilker, Peter; and Apel, Karl-Hermann, 4,714,105, Cl. 164-420.000.
Kubota, Ltd.: *See*—
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Kubota, Shigeo: *See*—
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Kuehl, Ulrich: *See*—
Thies, Peter W.; David, Samuel; Kuehl, Ulrich; Buschmann, Gerd; and Flecker, Peter, 4,714,709, Cl. 514-414.000.
Kuenzel, Werner, to Henkel Kommanditgesellschaft auf Aktien. Detergency booster cloths and dispenser therefor. 4,714,643, Cl. 428-131.000.
Kufner, Walter: *See*—
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Kuhl, Egbert: *See*—
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Kuhl, Hans-Dieter; and Schmidt, Hans-Dieter, to Deutsche Vortex GmbH. Ventilating device. 4,714,484, Cl. 55-170.000.
Kuhla, Donald E.; Studt, William L.; Campbell, Henry F.; and Yelnosky, John, to Rorer Pharmaceutical Corporation. Aryl substituted heterocycles for treating gastrointestinal motility dysfunction. 4,714,707, Cl. 514-361.000.
Kuhn, Alex: *See*—
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Kuhn, S.A.: *See*—
Ermacora, Rino; and Krebs, Thierry, 4,714,123, Cl. 180-14.400.
Kuku Schweissanlagen and Roboter GmbH: *See*—
Mazac, Karel, 4,714,818, Cl. 219-123.000.
Kumagai, Kazushi: *See*—
Kawada, Shigeki; Amemiya, Yoichi; Sogabe, Masatoyo; and Kumagai, Kazushi, 4,714,852, Cl. 310-156.000.
Kumashiro, Izumi: *See*—
Fukushima, Koji; Seto, Yoshiko; Kawada, Kazuhiro; Toi, Koji; and Kumashiro, Izumi, 4,714,713, Cl. 514-563.000.
Kumm, Emerson L.; and Kraver, Theodore C. Oriented flat belt continuously variable transmission using pulleys with guideways. 4,714,452, Cl. 474-49.000.
Kummel, Karen: *See*—
Laustsen, Mads A.; and Kummel, Karen, 4,714,664, Cl. 429-105.000.
Kumpitsch, Robert C.; and Retersdorf, James P., to General Electric Company. Mold method for superconductive joint fabrication. 4,713,878, Cl. 29-599.000.
Kuno, Mitsutoshi: *See*—
Kanno, Hideo; Yamashita, Shinichi; Enari, Masahiko; Kuno, Mitsutoshi; and Mizutome, Atsushi, 4,714,921, Cl. 340-784.000.
Kupeha Kagaku Kogyo Kabushiki Kaisha: *See*—
Okada, Yoshio; Akatsu, Masahiro; and Ohira, Yohichi, 4,714,495, Cl. 106-21.000.
Kuraiyama, Haruo: *See*—
Sato, Nobukatsu; Kuraiyama, Haruo; and Agou, Masanobu, 4,714,764, Cl. 546-271.000.
Kurata, Mitsuru: *See*—
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Kurata, Takatsugu: *See*—
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Kurihara, Kazumasa; and Arai, Kenji, to Diesel Kiki Co., Ltd. Speed responsive control for operating vehicle clutch. 4,714,145, Cl. 192-0.052.
Kuroshima, Ryoichi: *See*—
Mizuno, Takao; Uchikawa, Naoshi; Murayama, Akira; Tamura, Takahiro; and Kuroshima, Ryoichi, 4,714,415, Cl. 418-14.000.
Kuroyama, Yutaka: *See*—
Araki, Masatada; Kuroyama, Yutaka; Takeuchi, Yukihisa; Takagi, Makoto; and Imura, Toru, 4,713,871, Cl. 29-421.00E.
Kuroyanagi, Yoshimitsu: *See*—
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Kurtzman, Gary; Heck, Joseph P.; Hansen, Kenneth A.; Enderby, Ralph; and Vidugiris, Bronis, to Motorola, Inc. Frequency synthesizer. 4,714,899, Cl. 331-1.00A.
Kusakabe, Takaya: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yaautaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.
Kussmaul, Ulrich: *See*—
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Kusunoki, Shigeru: *See*—
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Kuwabara, Yukimasa: *See*—
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Kuwashima, Hidesumi: *See*—
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Kyocera Corporation: *See*—
Toeda, Shigetoshi, 4,714,062, Cl. 123-273.000.
Kyushu Hitachi Maxell, Ltd.: *See*—
Sayama, Shigeharu, 4,714,200, Cl. 239-579.000.
L. Schuler GmbH: *See*—
Hoehn, Herbert; and Strommer, Kurt, 4,713,961, Cl. 72-419.000.
Laakmann, Peter. Television rate optical scanner. 4,714,960, Cl. 358-206.000.
Lafon, Louis, to Societe Anonyme Dite: Laboratoire L. Lafon. 2-tolylmorpholine derivatives and pharmaceutical compositions. 4,714,699, Cl. 514-227.000.
Lagerberg, Stig E. V., to Santrade Limited. Tool and insert, preferably for turning. 4,714,384, Cl. 407-103.000.
Laib, Donald L., to Forest Grove Industries, Inc. Guidance system for self-guided vehicle. 4,714,124, Cl. 180-168.000.
Lambert, David K., to General Motors Corporation. Thermal diffusion fluid flow sensor. 4,713,970, Cl. 73-861.050.
Lambert, William M., to Mine Safety Appliances Company. Replenishable self contained breathing apparatus. 4,714,077, Cl. 128-202.270.
Lamiaux, Sylves; and Kuhn, Alex, to Societe d'Applications Generales d'Electricite et de Mecanique (SAGEM). Memory safeguard device for microprocessor. 4,715,016, Cl. 365-229.000.
Landrum, Ralph A., Jr., to Western Atlas International, Inc. Simultaneous performance of multiple seismic vibratory surveys. 4,715,020, Cl. 367-38.000.
Lang, Warren R., to Motorola, Inc. Uniform emission backlight. 4,714,983, Cl. 362-27.000.
Lange, Ronald W.; Reynolds, David F.; Lolley, David R.; and Freeman, Gary L., to Deere & Company. Tool for installing an eccentric locking collar on a bearing. 4,713,881, Cl. 29-724.000.
Langham, Richard J., to D.R.I.M. Limited. Fire-break door. 4,714,285, Cl. 292-163.000.
Languillat, Jean-Paul, to Lhomme S.A. Process and apparatus for truncating tubes. 4,713,992, Cl. 82-48.000.
Lardellier, Alain M. J., to Societe Nationale d'Etudes et de Construction de Moteurs O'Aviation (S.N.E.C.M.A.). Apparatus for controlling radial clearance between a rotor and a stator of a tubrojet engine compressor. 4,714,404, Cl. 415-127.000.
Latimer N.V.: *See*—
Cascajosa, Felix G., 4,714,065, Cl. 123-452.000.
LaTorre, Fredrick E.: *See*—
Henry, Daniel P.; LaTorre, Fredrick E.; and Pope, Willard I., 4,714,255, Cl. 273-249.000.
Lau, Kam C.; and Hocken, Robert J., to United States of America, Commerce. Three and five axis laser tracking systems. 4,714,339, Cl. 356-4.500.
Laufer, Helmut: *See*—
Bohringer, Wilfried; Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, 4,714,412, Cl. 417-289.000.
Laustsen, Mads A.; and Kummel, Karen, to A/S Hellesens. Electrical battery. 4,714,664, Cl. 429-105.000.
Lawson, R. Joe: *See*—
Moser, Mark D.; and Lawson, R. Joe, 4,714,539, Cl. 208-139.000.
Moser, Mark D.; and Lawson, R. Joe, 4,714,540, Cl. 208-139.000.
Lawson, Randy J.: *See*—
Moser, Mark D.; and Lawson, Randy J., 4,714,538, Cl. 208-139.000.
Leandri, Jacqueline: *See*—
Rey, Pierre; Abbou, Clement; Leandri, Jacqueline; and Sezeur, Alain J. P. R., 4,714,074, Cl. 128-1.100.
Leaphart, C. Mark. Laundering bag for paired items. 4,714,353, Cl. 383-117.000.
Leblong, Wayne T.: *See*—
Anthony, Jack; Bilstad, Arnold C.; Leblong, Wayne T.; and Kruger, Robert J., 4,714,595, Cl. 422-294.000.
Lechner, Fritz; Heissler, Herbert; Scheer, Wolfgang; Siebels, Wolfgang; and Ascherl, Rudolf, to M A N Technologie GmbH. Reinforced fiber bone replacement implant having treated surfaces and a method for its manufacture. 4,714,467, Cl. 623-16.000.
Lechner, Robert; Rudolf, Hans-Werner; and Krimmer, Roland, to Siemens Aktiengesellschaft. Protective circuit for the overvoltage protection of a subscriber line interconnect circuit. 4,715,058, Cl. 379-27.000.
Lederman, Frederick E., to General Motors Corporation. Overrunning clutch with sealing member. 4,714,803, Cl. 192-41.00R.
Lee, Chun-Shen, to Amada Engineering & Service Co., Inc. Laser system. 4,715,040, Cl. 372-98.000.
Lee, Michael C.; and Golden, Mark A., to General Motors Corporation. Low coefficient of friction nylon blend. 4,714,740, Cl. 525-179.000.
Lee, Sam Y., to Mattel, Inc. Toy figure with expandable latch. 4,714,446, Cl. 446-311.000.
Leemhuis, Richard S., to Vickers, Incorporated. Power transmission. 4,714,005, Cl. 91-361.000.

Lei, Lawrence C.: *See—*
Freeman, Kenneth F.; Garrett, Charles B.; Harra, David J.; and Lei, Lawrence C., 4,714,536, Cl. 204-298.000.

Lekholm, Anders: *See—*
Hedberg, Sven-Erik; Lekholm, Anders; and Lindgren, Anders, 4,714,079, Cl. 128-419.0PG.

Lenhardt, Karl, to Saint-Gobain Vitrage. Preparation of a plastic for its extrusion particularly in the form of a gaged bead intended to be used as a seal and interlayer in multiple glazings. 4,714,425, Cl. 425-461.000.

Lescure, Alain: *See—*
Force, Christian; and Lescure, Alain, 4,714,229, Cl. 248-610.000.

Leslie Hartridge Limited: *See—*
Bussey, Stephen; Cockburn, Barry; and Heath, Alastair E. F., 4,714,998, Cl. 364-431.010.

L'Etat Francais represente par le Delegue Ministeriel pour l'Armement: *See—*
Bocker, Jurgen; Klein, Klaus W.; Gersbach, Klaus; Sauvestre, Jean-Claude; and Montier, Patrick, 4,714,024, Cl. 102-521.000.

Levine, Alfred B. Dual electronic camera, previewing, and control. 4,714,962, Cl. 358-209.000.

LeVine, Arthur L. Sharpener mounting construction. 4,714,239, Cl. 269-3.000.

Levitator, Inc.: *See—*
Stevenson, Ernest W.; and Nahas, Randall E., 4,714,375, Cl. 405-3.000.

Lewis, Kenneth A.; Alpern, Alan N.; Frank, Andrew C.; and Ross, Stuart E., to GridComm, Inc. System protocol for composite shift keying communication system. 4,715,045, Cl. 375-58.000.

Lhomme S.A.: *See—*
Languillat, Jean-Paul, 4,713,992, Cl. 82-48.000.

Libert, James T.: *See—*
Hoelzer, John S.; Graefe, Richard J.; and Libert, James T., 4,714,977, Cl. 361-196.000.

Liberty Diversified Industries: *See—*
Thorud, Stanley R., 4,714,161, Cl. 206-387.000.

Lin, Chun-Hong: *See—*
Kabasawa, Satoshi; Hsieh, Ming-Shiun; Chang, Shih-Ming; and Lin, Chun-Hong, 4,715,004, Cl. 364-513.500.

Lincoln, John B., to Ocean Engineering Systems, Pty., Ltd. Apparatus and method for trenching subsea pipelines. 4,714,378, Cl. 405-163.000.

Linde Aktiengesellschaft: *See—*
Ranke, Gerhard; and Siegert, Friedrich, 4,713,940, Cl. 62-17.000.

Linden, Olavi, to Oy Fiskars AB. Package for scissors. 4,714,159, Cl. 206-349.000.

Linderman, Ray D.; and Williams, Peter C., to Whitey Co. Soft seat for metering valve. 4,714,237, Cl. 251-330.000.

Lindgren, Anders: *See—*
Hedberg, Sven-Erik; Lekholm, Anders; and Lindgren, Anders, 4,714,079, Cl. 128-419.0PG.

Lindgren, Hakan; and Anderson, Bjorn, to Bulten-Kanthal AB. Thermal protective shield. 4,714,659, Cl. 428-685.000.

Lindstrom, Robert O.: *See—*
Kozlowski, Thomas A.; Lindstrom, Robert O.; Loughrin, Thomas D.; and Baka, Kathleen J., 4,714,181, Cl. 222-480.000.

Ling, Daniel T.: *See—*
Oklobdzija, Vojin G.; and Ling, Daniel T., 4,714,994, Cl. 364-200.000.

Lion Corporation: *See—*
Nakamura, Tsuneaki; Kiyoshige, Tatsuo; and Sasaki, Shuji, 4,714,612, Cl. 424-85.000.

Liposome Company, Inc., The: *See—*
Tremblay, Paul A.; and Kearns, John J., 4,714,571, Cl. 260-403.000.

Lips, Hendrik; and Peters, Joerg, to Rheinmetall GmbH. Inserts for coating an explosive charge, and forming a rod-shaped projectile, and process for manufacture of inserts. 4,714,019, Cl. 102-307.000.

Lipscher, Bernard N.; and Coleman, Kevin G. Door message apparatus with telephone answering device. 4,715,060, Cl. 379-70.000.

Lischke, Burkhard: *See—*
Rose, Harald; Zach, Joachim; and Lischke, Burkhard, 4,714,833, Cl. 250-397.000.

Lisica, Vincent M.: *See—*
Barnett, Joseph A.; Gomez, Joseph M.; Green, William F.; Lisica, Vincent M.; and Rosenthal, Arnold B., 4,714,400, Cl. 414-751.000.

Lisle Corporation: *See—*
Pool, James L., 4,713,869, Cl. 29-275.000.

Litowitz, Robert H. Table saw guide construction. 4,713,993, Cl. 83-34.000.

Liu, Ming-Biann, to Dow Chemical Company, The. Process for preparing halogenated trialkyl phosphate esters. 4,714,771, Cl. 558-102.000.

Livingston, David L.; Sucher, Daniel J.; and Walk, Bruce M., to International Business Machines Corporation. Apparatus and method for effecting dynamic address translation in a microprocessor implemented data processing system. 4,714,993, Cl. 364-200.000.

Lobmann, Michele: *See—*
Delgoffe, Jean-Claude; Lobmann, Michele; and Zygraich, Nathan, 4,714,678, Cl. 435-235.000.

Locher, Anton: *See—*
Bachhofer, Bruno; and Locher, Anton, 4,714,551, Cl. 210-278.000.

Lockett, William, Jr., to Encon Associates Inc. Distillation vapor and feed mixing process. 4,714,542, Cl. 208-347.000.

Lockmasters, Inc.: *See—*
Phillips, Peter J., 4,714,386, Cl. 408-72.00R.

Loeffler, Norman R.: *See—*
Najvar, Daniel J.; Pope, Brian G.; and Loeffler, Norman R., 4,714,722, Cl. 523-218.000.

Lofgren, Lars-Gunnar, to Nitro Nobel AB. Method and means for connecting fuses. 4,714,018, Cl. 102-275.700.

Lolley, David R.: *See—*
Lange, Ronald W.; Reynolds, David F.; Lolley, David R.; and Freeman, Gary L., 4,713,881, Cl. 29-724.000.

Lonardi, Emile: *See—*
Bernard, Gilbert; Breden, Emile; and Lonardi, Emile, 4,714,396, Cl. 414-161.000.

Londrigan, Michael E.; and Skowronski, Michael J., to Jim Walter Resources, Inc. Polyester polyols modified by low molecular weight glycols and cellular foams therefrom. 4,714,717, Cl. 521-131.000.

Long, Murray D.: *See—*
Jefferies, Keith W.; and Long, Murray D., 4,714,048, Cl. 119-14.080.

Looms, John S. T.: *See—*
Atkins, Alan D.; Elliott, Kenneth; and Looms, John S. T., 4,714,800, Cl. 174-73.00R.

Looney, Ralph W.: *See—*
Hughes, Vincent L.; and Looney, Ralph W., 4,714,749, Cl. 526-290.000.

Lopez, Sergio: *See—*
Hascal, Marcel; Lopez, Sergio; Danielski, Andrew; and Mihai, Adrian, 4,714,915, Cl. 340-657.000.

Lopiccolo, Mario T.: *See—*
Swarts, Richard E.; Moffatt, E. Marston; and Lopiccolo, Mario T., 4,714,815, Cl. 219-121.0LC.

Loram Maintenance of Way, Inc.: *See—*
Bull, Timothy B. H.; and Wahl, Raymond C., 4,713,898, Cl. 37-96.000.

Lorch, Douglas J.: *See—*
Gladney, Henry M.; Lorch, Douglas J.; and Mattson, Richard L., 4,714,992, Cl. 364-200.000.
Gladney, Henry M.; Lorch, Douglas J.; and Mattson, Richard L., 4,714,996, Cl. 364-300.000.

Lorenz, Joachim; and Gattinger, Martin, to MTU Motoren-und Turbinen Union Muenchen GmbH. Lubricating system for gas turbine engines and pump for such a system. 4,714,139, Cl. 184-6.110.

Lorica S.p.A.: *See—*
Poletto, Giorgio, 4,714,652, Cl. 428-308.400.

Loth, Fritz: *See—*
Henklein, Peter; Becker, Manfred; Buttner, Werner; Loth, Fritz; Dautzenberg, Horts; Forner, Klaus; Dolling, Rudolf; Graul, Karl-Heinz; Halatsch, Wolf-Rainer; and Rupprich, Christian, 4,714,768, Cl. 548-435.000.

Loughrin, Thomas D.: *See—*
Kozlowski, Thomas A.; Lindstrom, Robert O.; Loughrin, Thomas D.; and Baka, Kathleen J., 4,714,181, Cl. 222-480.000.

Low, Michael L.: *See—*
Craft, Jack; Low, Michael L.; and Yorkanis, Bernard J., 4,714,871, Cl. 323-315.000.

Lowe, Thomas B.: *See—*
Fidler, Fredrick H.; and Lowe, Thomas B., 4,714,072, Cl. 126-1.00F.

Lubrizol Corporation, The: *See—*
Hoke, Donald I., 4,714,561, Cl. 252-51.50A.

Lucas Industries Public Limited Company: *See—*
Farr, Glyn P. R., 4,714,301, Cl. 303-116.000.

Luciani, Sabatino: *See—*
Santandrea, Luciano; and Luciani, Sabatino, 4,713,883, Cl. 29-736.000.

Luke, John A., to British-American Tobacco Company Limited. Making of multi-element smoking article rod. 4,714,083, Cl. 131-94.000.

Luken, Clement H., Jr.; and Kinsman, Donald V., to National Distillers and Chemical Corporation. Wax compositions. 4,714,496, Cl. 106-270.000.

Luma Telecom, Inc.: *See—*
Cooper-Hart, Michael A.; Emmons, Lawrence D.; Mackley, James S.; and Stokes, David H., 4,715,059, Cl. 379-53.000.

Lumbra, Douglas L.: *See—*
Buller, Marvin L.; Lumbra, Douglas L.; Phelps, Douglas W.; Samuelsen, Sigvart J.; and Ward, William C., 4,714,953, Cl. 357-81.000.

Lundstrom, Kurt A.: *See—*
Wallin, Per Olov T.; Warell, Bengt H.; Svensson, Ake P.; Lundstrom, Kurt A.; and Johansson, Lars A., 4,714,025, Cl. 108-20.000.

Lupfer, David A.: *See—*
Bernstein, Richard; Anthony, William H.; and Lupfer, David A., 4,714,905, Cl. 333-167.000.

Lurvey, Victor E.: *See—*
Cagle, Larry L.; Andersen, Keith D.; and Lurvey, Victor E., 4,714,578, Cl. 264-255.000.

Lustig, Stanley; Schuetz, Jeffrey M.; and Vicik, Stephen J., to Viskase Corporation. Irradiated multilayer film for primal meat packaging. 4,714,638, Cl. 428-35.000.

Lutz, Carl D.: *See—*
Helinski, Richard R.; Lutz, Carl D.; Peer, Thomas R.; and Eno, Philip A., 4,714,936, Cl. 346-140.00R.

Ly, Binh T. Portable beverage brewing apparatus. 4,714,011, Cl. 99-279.000.

Lydtin, Hans-Jurgen: *See—*
Auwerda, Cornelis P.; Geittner, Peter E. E.; and Lydtin, Hans-Jurgen, 4,714,589, Cl. 427-39.000.

Lynch, Charles T.; Vahldiek, Fred W.; and Khobaib, Mohammad, to United States of America, Air Force. High performance multifunctional corrosion inhibitors especially for combining at 20 to 50 weight percent with soap or paint. 4,714,564, Cl. 252-110.000.

Lynn, Shelby A.: *See—*
Sisk, George W.; Lynn, Shelby A.; Keil, John P.; and Woods, John T., 4,714,304, Cl. 312-214.000.

M A N Technologie GmbH: *See—*
Lechner, Fritz; Heisaler, Herbert; Scheer, Wolfgang; Siebels, Wolfgang; and Ascherl, Rudolf, 4,714,467, Cl. 623-16.000.

M-O Valve Company Limited, The: *See—*
Clark, Michael J., 4,714,859, Cl. 315-39.670.

Macey, William: *See—*
Winter, Trevor; and Macey, William, 4,714,930, Cl. 343-786.000.

MacGregor, Douglas B.; Zolnowsky, John; and Mothersole, David, to Motorola, Inc. Coprocessor instruction format. 4,715,013, Cl. 364-900.000.

Mack, Theo; and Edlund, Roy, to Busak + Luyken GmbH & Co. Sealing ring structure with stressing ring. 4,714,259, Cl. 277-165.000.

Mackley, James S.: *See—*
Cooper-Hart, Michael A.; Emmons, Lawrence D.; Mackley, James S.; and Stokes, David H., 4,715,059, Cl. 379-53.000.

Maeda, Tatsumi: *See—*
Ito, Takeo; Takeuchi, Hajime; Hashimoto, Minoru; and Maeda, Tatsumi, 4,714,654, Cl. 428-328.000.

Maeda, Tsutomu: *See—*
Watabe, Seiji; Yokoyama, Isao; Sasaki, Masanori; Toyoshima, Yotaro; Takahashi, Sumio; and Maeda, Tsutomu, 4,714,908, Cl. 335-212.000.

Maehara, Akihiro: *See—*
Hashimoto, Takatsugu; Maehara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, 4,714,734, Cl. 524-496.000.

Maeno, Hiroshi: *See—*
Tamamura, Hideo; and Maeno, Hiroshi, 4,714,333, Cl. 354-64.000.

Magnaghi, Edgardo: *See—*
Bosco, Angelo; and Magnaghi, Edgardo, 4,714,212, Cl. 242-182.000.

Magnaghi Oleodinamica S.p.A.: *See—*
Tovagliaro, Constantino, 4,714,094, Cl. 138-31.000.

Maguire, John B. Auxiliary window lock. 4,713,911, Cl. 49-394.000.

Mahapatra, Amaresh; and McMahon, Donald H., to Polaroid Corporation. Integrated optic multi/demultiplexer. 4,715,027, Cl. 370-3.000.

Mail, Jacob A., to Boeing Company, The. Aircraft wheel brake metering and despin valve. 4,714,298, Cl. 303-100.000.

Mainland, Donald R., to Kolar Arms. Choke assemblies for shotguns. 4,713,903, Cl. 42-79.000.

Maisch, Dieter, to Herion-Werke KG. Shuttle piston cylinder. 4,714,007, Cl. 92-88.000.

Maki, Yoshitaka: *See—*
Nohara, Akira; and Maki, Yoshitaka, 4,714,774, Cl. 560-053.000.

Makino, Osamu: *See—*
Nakatani, Seiichi; Yuhaku, Satoru; Oxinaka, Hideyuki; Ishida, Toru; Makino, Osamu; and Kikuchi, Tatsuro, 4,714,570, Cl. 252-518.000.

Makino, Reiji: *See—*
Horiki, Seinosuke; Makino, Reiji; Ito, Kuninori; and Unno, Tetsuji, 4,714,633, Cl. 427-282.000.

MaKosch, Gunter, to International Business Machines Corporation. Method and arrangement for optically determining surface profiles. 4,714,348, Cl. 356-351.000.

Malladi, Devi P.; Mathew, Ranjan; and Shah, Divyesh P., to National Semiconductor Corporation. Copper cleaning and passivating for tape automated bonding. 4,714,517, Cl. 156-629.000.

Malloy Desormeaux, Stephen G., to Eastman Kodak Company. Camera with door release and film rewind interlock. 4,714,335, Cl. 354-214.000.

Malson, William S.; and Sharpe, John W., to Water Systems Development Corporation. Canteen carried water purifier system. 4,714,550, Cl. 210-244.000.

Mamada, Akira: *See—*
Yamasaki, Harumasa; Morii, Masayoshi; Yokota, Yukinaga; Mamada, Akira; and Nabata, Yoshiyuki, 4,714,719, Cl. 521-163.000.

Manner, James A., to PPG Industries, Inc. Method for converting organic chloroformate to the corresponding organic chloride. 4,714,785, Cl. 568-614.000.

Mannesmann AG: *See—*
Keutgen, Franz; Kubon, Achim; Perings, Dieter; Stadler, Peter; Voss-Spilker, Peter; and Apel, Karl-Hermann, 4,714,105, Cl. 164-420.000.
Kubon, Achim; and Voss-Spilker, Peter, 4,714,106, Cl. 164-484.000.

Mannesmann Demag Corporation: *See—*
Polick, Raymond L.; Tamburrino, Kenneth D.; and Becker, Edmund H., 4,714,103, Cl. 164-486.000.

Manning, Maurice; and Sawyer, Wilbur H., to Medical College of Ohio; and Columbia University, Trustees of, a part interest. Novel derivatives of arginine vasopressin antagonists. 4,714,696, Cl. 514-11.000.

Marabotto, Eduardo J.; Bresin, Mark S.; and Drake, Bick R., to Motorola, Inc. Electrical connector. 4,714,439, Cl. 439-627.000.

Marek, Donald C., to J. I. Case Company. Axle oscillation adjustment means. 4,714,263, Cl. 280-111.000.

Marketing Displays, Inc.: *See—*
Hillstrom, David U.; and Cope, Dennis R., 4,714,220, Cl. 248-160.000.

Marquardt, Hans: *See—*
Shoyab, Mohammed; Marquardt, Hans; and Todaro, George J., 4,714,683, Cl. 436-547.000.

Mars, Inc.: *See—*
Bailey, John W.; Hayter, Paul A.; Mason, Brian R.; and Turner, Graham N., 4,714,875, Cl. 324-73.0PC.

Marsden, Richard J.: *See—*
Erskine, William G.; and Marsden, Richard J., 4,714,931, Cl. 346-75.000.

Marshall, Charles H., to Westinghouse Electric Corp. Oblique observation attachment for microscopes. 4,714,327, Cl. 350-504.000.

Martin, Eugene J.: *See—*
Tootle, James N.; and Martin, Eugene J., 4,714,006, Cl. 92-5.00R.

Martin, Francis W.: *See—*
Holleran, Louis M.; and Martin, Francis W., 4,714,687, Cl. 501-9.000.

Martino, Germain: *See—*
Trinh Dinh, Chan; Desvard, Alain; and Martino, Germain, 4,714,688, Cl. 502-33.000.

Marty, Michel: *See—*
Baudrant, Annie; and Marty, Michel, 4,714,951, Cl. 357-67.000.

Maruhashi, Yoshitsugu; Tanikawa, Isao; and Hirata, Sadao, to Toyo Seikan Kaisha, Ltd. Plastic vessel having oriented coating and process for preparation thereof. 4,714,580, Cl. 264-516.000.

Maruishi Seiyaku Kabushiki Kaisha: *See—*
Sato, Nobukatsu; Kuraiyama, Haruo; and Agou, Masanobu, 4,714,764, Cl. 546-271.000.

Maruyama, Hiroshi: *See—*
Kato, Yoshitake; Fujita, Minoru; and Maruyama, Hiroshi, 4,714,973, Cl. 360-133.000.

Maruyama, Toshio; Shibuya, Noriaki; and Nakata, Yukihiko, to Sharp Kabushiki Kaisha. Charging and discharging control circuit for a storage battery. 4,714,868, Cl. 320-5.000.

Marx, Matthias: *See—*
Horn, Peter; Baumann, Edwin; and Marx, Matthias, 4,714,718, Cl. 521-134.000.

Marzoni, Gifford P.: *See—*
Garbrecht, William L.; Marzoni, Gifford P.; and Whitten, Kathleen R., 4,714,704, Cl. 514-288.000.

Masamura, Tatsuro, to Canadian Patents And Development Limited. Frequency offset diversity receiving system. 4,715,048, Cl. 375-100.000.

Mascetti, Paolo, to Camoga S.p.A. Device adapted to move the sharpening grinding wheels in a leather splitting machine close to and away from a cutting blade. 4,713,950, Cl. 69-10.000.

Mason, Brian R.: *See—*
Bailey, John W.; Hayter, Paul A.; Mason, Brian R.; and Turner, Graham N., 4,714,875, Cl. 324-73.0PC.

Massey-Ferguson Services N.V.: *See—*
Mueller, Otto, Jr., 4,715,012, Cl. 364-900.000.

Masuda, Shuji; and Oda, Hiroyuki, to Mazda Motor Corporation. Single overhead camshaft engine. 4,714,059, Cl. 123-90.230.

Masui, Takachika: *See—*
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, 4,714,791, Cl. 568-913.000.

Masumura, Masanori: *See—*
Muto, Osamu; Masumura, Masanori; and Hori, Yoshiaki, 4,713,979, Cl. 74-337.500.

Materna, Anthony T.; Vossler, Roger A.; and Stepczyk, Frank M., to TRW Inc. Computer integration system. 4,714,995, Cl. 364-200.000.

Mather, Graham W.; Warwick, Graham R.; and Bazeley, Graham A., to Fisherwell Limited. Folding golf cart. 4,714,268, Cl. 280-646.000.

Mathew, Ranjan: *See—*
Malladi, Devi P.; Mathew, Ranjan; and Shah, Divyesh P., 4,714,517, Cl. 156-629.000.

Matsubara, Katsumi; Uchida, Riichi; Muramatsu, Masatoshi; Naya, Kotaro; and Takagi, Tsuneharu, to Hitachi, Ltd. Screw type vacuum pump. 4,714,418, Cl. 418-201.000.

Matsuda, Eiichi, to Fine Foods Research Cooperative Union. Process for treating frozen block meat. 4,714,618, Cl. 426-524.000.

Matsuishi, Tsutomu: *See—*
Tanaka, Kiyoshi; Saeki, Masaru; Matsuishi, Tsutomu; Koga, Yoshihiro; and Kawakita, Tetsuya, 4,714,767, Cl. 548-344.000.

Matsuki, Taketo: *See—*
Nakahara, Akihiro; and Matsuki, Taketo, 4,714,253, Cl. 273-228.000.

Matsumoto, Hironori: *See—*
Hashimoto, Takatsugu; Maehara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, 4,714,734, Cl. 524-496.000.

Matsumoto, Osamu: *See—*
Ueda, Kazuhiro; Yamaguchi, Toshiaki; Kajiyama, Kouji; and Matsumoto, Osamu, 4,714,089, Cl. 137-614.180.

Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, to Kabushiki Kaisha Kobe Seiko Sho; Idemitsukosan Kabushiki Kaisha; Mitsubishikaseikogyo Kabushiki Kaisha; and Aziasekiyu Kabushiki Kaisha. Method of treating brown coal for liquefaction. 4,714,543, Cl. 208-412.000.

Matsumura, Toshio, to Nisson Motor Co., Ltd. Reduction ratio control for continuously variable transmission. 4,713,987, Cl. 74-866.000.

Matsuo, Noritada; Tsushima, Kazunori; Nishida, Sumio; and Yano, Toshihiko, to Sumitomo Chemical Company, Limited. Carboxylic acid esters and insecticides containing them as the active ingredient. 4,714,712, Cl. 514-531.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Akiba, Yasuhiro; Namba, Masato; Kikuchi, Seiji; and Soejima, Hidenobu, 4,714,850, Cl. 310-49.00R.
Kabasawa, Satoshi; Hsieh, Ming-Shiun; Chang, Shih-Ming; and Lin, Chun-Hong, 4,715,004, Cl. 364-513.500.
Nakatani, Seiichi; Yuhaku, Satoru; Okinaka, Hideyuki; Ishida, Toru; Makino, Osamu; and Kikuchi, Tatsuro, 4,714,570, Cl. 252-518.000.
Sano, Kiyoshi, 4,714,416, Cl. 418-63.000.
Takano, Hiroji, 4,714,957, Cl. 358-93.000.
Yokoyama, Toshinobu; Watanabe, Sadao; and Kurata, Takatsugu, 4,714,863, Cl. 315-366.000.

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Mattel, Inc.: *See*—
Lee, Sam Y., 4,714,446, Cl. 446-311.000.

Mattson, Richard L.: *See*—
Gladney, Henry M.; Lorch, Douglas J.; and Mattson, Richard L., 4,714,992, Cl. 364-200.000.
Gladney, Henry M.; Lorch, Douglas J.; and Mattson, Richard L., 4,714,996, Cl. 364-300.000.

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Bohmler, Heinz; Daumer, Rolf; Mayer, Dieter; and Perenthaler, Egbert, 4,715,009, Cl. 364-565.000.

Mayse, Noble R. Christmas light hangers. 4,714,219, Cl. 248-65.000.

Mazac, Karel, to Kuku Schweissanlagen and Roboter GmbH. Magnetic control device for arc welding. 4,714,818, Cl. 219-123.000.

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Imazu, Shigeki, 4,714,064, Cl. 123-339.000.
Masuda, Shuji; and Oda, Hiroyuki, 4,714,059, Cl. 123-90.230.
Oda, Hiroyuki; and Kageyama, Akira, 4,714,058, Cl. 123-90.220.
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Guioth, Chantal H.; Maze, Etienne G.; and Trescol, Jean J., 4,714,531, Cl. 204-181.700.
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De Antoniis, Mario; Fiorini, Mario; and Mazzamurro, Giuseppina, 4,714,769, Cl. 556-419.000.

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McAlister, Roy E. Apparatus for fushion welding plastic pipe joints. 4,714,513, Cl. 156-359.000.

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Heggart, Ronald G.; McClintock, Willard K.; and Engstrom, Randy J., 4,715,042, Cl. 373-74.000.

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Quinn, Clayton B.; McClish, Richard R.; and Moore, James E., 4,714,657, Cl. 428-412.000.

McClung, James A.: *See*—
Bulso, Joseph D., Jr.; and McClung, James A., 4,713,958, Cl. 72-348.000.

McClure, Richard J.; and Jeffers, Frederick J., to Eastman Kodak Company. Apparatus utilizing dispersion shear. 4,714,324, Cl. 350-362.000.

McCoy, Daniel E.; Garver, Donald L.; and Hileman, George, to Dorr-Oliver Incorporated. Apparatus to reduce or eliminate fluid bed tube erosion. 4,714,049, Cl. 122-4.00D.

McCready, Russell J.; and Tyrell, John A., to General Electric Company. Thermoplastic polyetherimide ester elastomers exhibiting improved hydrolytic stability. 4,714,753, Cl. 528-288.000.

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McEachern, Richard D.; Jordan, Willie W.; Gebheim, Gerald C.; and Robinson, Joe M., to AgRobotics, Inc. Farm chemical delivery system. 4,714,196, Cl. 239-62.000.

McGlashen, James N., to Apsley Metals Limited. Vehicle and tire therefore. 4,714,099, Cl. 152-523.000.

McGoldrick, Gilbert A.; and Slicer, Allan E., to Square D Company. Electrical distribution system having an improved plug-in assembly for current tap-off. 4,714,431, Cl. 439-212.000.

McLaughlin, Henry: *See*—
Kelly, George G.; McLaughlin, Henry; and Simon, James R., 4,714,017, Cl. 102-275.300.

McMahon, Donald H.; and Johnson, Gilbert L., Jr., to Polaroid Corporation. Optical communication system. 4,715,028, Cl. 370-3.000.

McMahon, Donald H.: *See*—
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McPherson, Hugh; and Stoker, Jeffrey, to Ferranti, plc. Microwave noise measuring apparatus. 4,714,873, Cl. 324-57.00N.

Medem, Harald: *See*—
Stammann, Gunter; Kricsfalussy, Zoltan; Waldmann, Helmut; Schneider, Joachim; and Medem, Harald, 4,714,689, Cl. 502-54.000.

Medical College of Ohio: *See*—
Manning, Maurice; and Sawyer, Wilbur H., 4,714,696, Cl. 514-11.000.

Medina, Antonio: *See*—
Zeevi, Yehoshua Y.; and Medina, Antonio, 4,714,319, Cl. 350-144.000.

Medlin, William L.; and Zumwalt, Gary L., to Mobil Oil Corporation. Borehole logging method for determining the damping of acoustic tube waves in subsurface formations along a borehole wall. 4,715,019, Cl. 367-31.000.

Meeker, Gregory W.; Bleck, Norris E.; Rizzi, Marc A.; and Irick, Carl M., to Farrel Corporation. Rotary plasticator screw injection machine. 4,714,422, Cl. 425-204.000.

Meeker, Thrygve R.: *See*—
Andrews, George E.; Davis, Paul C.; Farley, Dennis C.; Kravitz, Stanley H.; Meeker, Thrygve R.; Petersen, Owe G.; and Schelling, Arthur W., 4,715,049, Cl. 375-106.000.

Meguro, Hiroshi: *See*—
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Meier, Remy: *See*—
Comte, Pierre-Andre; Burri, Caius; Claes, Lutz; Gerngross, Heinz; and Meier, Remy, 4,714,076, Cl. 128-92.0ZW.

Meiji Milk Products Company Limited: *See*—
Takahashi, Yasuyuki; Aizawa, Shigeru; Tamai, Shigeru; Yoshida, Toshiro; and Takahashi, Takeshi, 4,714,566, Cl. 252-314.000.

Meissner, Ralph; and Popp, Walter, to Siemens Aktiengesellschaft. Nuclear magnetic resonance tomography apparatus. 4,714,887, Cl. 324-322.000.

Melis, Egon: *See*—
Harhoff, Karl; and Melis, Egon, 4,714,154, Cl. 198-514.000.

Melman, Paul: *See*—
Eichen, Elliot; Melman, Paul; and Cook, Kenneth, 4,714,346, Cl. 356-349.000.

Mennie, John; Troglio, Donald L.; and Zielinski, Larry E., to Wheeling Stamping Company. Packaging machine and method. 4,713,926, Cl. 53-443.000.

Menth, Anton: *See*—
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Mercer, John E.: *See*—
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Merck & Co., Inc.: *See*—
Miller, Douglas K.; and Joshua, Henry, 4,714,711, Cl. 514-464.000.

Merkle, Josef, to Daimler-Benz Aktiengesellschaft. Bending bar to be used as a bumper of a vehicle. 4,714,287, Cl. 293-102.000.

Merlin Gerin: *See*—
Bartolo, William; Boillot, Louis; Challande, Rene ; De Robertis, Patrick; Duchenaud, Jacky; and Ramaciotti, Jean-Claude, 4,714,907, Cl. 335-45.000.

Merz, Donald M.: *See*—
Bunker, William M.; and Merz, Donald M., 4,714,428, Cl. 434-43.000.

Meschan, Franz: *See*—
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Messer Griesheim GmbH: *See*—
Gahrs, Hans J., 4,714,617, Cl. 426-427.000.

Meston, Spencer D.; and Phillips, John W., to British Aerospace Public Limited Company. Fin erecting mechanisms. 4,714,216, Cl. 244-3.290.

Metteer, N. Bruce: *See*—
Deem, Jake O.; Kassik, Ronald W.; and Metteer, N. Bruce, 4,715,001, Cl. 364-484.000.

Meyers, John: *See*—
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Buckle, Ian G.; and Michael, John P., 4,713,917, Cl. 52-167.000.

Michaelson, Robert C.; and Plotkin, Jeffrey S., to Exxon Chemical Patents Inc. Tertiary olefin process. 4,714,783, Cl. 568-697.000.

Micro Component Technology, Inc.: *See*—
Kantrud, Steven G.; Ericson, Steven V.; and Seidel, Karl R., Jr., 4,714,150, Cl. 198-463.300.

Middlesworth, Jeffrey A.: *See*—
Hodgson, William J., Jr.; and Middlesworth, Jeffrey A., 4,714,735, Cl. 524-514.000.

Mihai, Adrian: *See*—
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Mihara, Tohru, to Taisei Road Construction Co., Ltd. Road surface layer reproducing machine. 4,714,374, Cl. 404-91.000.

Mike & Kremmel Ltd.: *See*—
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Mikelk, Paul D.: *See*—
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Miller, Bernard F., to Ingersoll-Rand Company. Plural-stage gas compressor. 4,714,414, Cl. 418-11.000.

Miller, Douglas K.; and Joshua, Henry, to Merck & Co., Inc. 6-hydroxy-2(2-hydroxy-4-methoxyphenyl)benzofuran derivatives to inhibit leukotriene biosynthesis. 4,714,711, Cl. 514-464.000.
Miller, Mike F.; and Gunther, Kim M., to Spectra-Physics, Inc. Internal resonator water cooled ion laser. 4,715,039, Cl. 372-37.000.
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Cabrera, Alejandro L.; Kirner, John F.; Miller, Robert A.; and Pierantozzi, Ronald, 4,714,632, Cl. 427-255.100.
Mimoto, Toshio; and Ota, Yoshiji, to Sharp Kabushiki Kaisha. Dynamic semiconductor memory with improved sense signal. 4,715,015, Cl. 365-210.000.
Mimura, Takashi; and Hiyamizu, Satoshi, to Fujitsu Limited. HEMT with epitaxial narrow bandgap source/drain contacts isolated from wide bandgap layer. 4,714,948, Cl. 357-22.000.
Minai, Masayoshi; and Ueda, Yuji, to Sumitomo Chemical Co., Ltd. Process for preparing optically active 4-hydroxy-2-cyclopentenones. 4,714,782, Cl. 568-347.000.
Minami, Takao: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yasutaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.
Minard, Paul G.; Alba, James; and Pacyna, David A., to Westinghouse Electric Corp. Moisture trap for a moisture separator reheater. 4,714,054, Cl. 122-483.000.
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Minialoff, Gerrard O.; and Minialoff, Martin J. Stud for walls. 4,713,921, Cl. 52-579.000.
Minialoff, Martin J.: *See*—
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Minnesota Mining and Manufacturing Company: *See*—
Archibald, G. Kent; and Slaker, Frank A., 4,714,463, Cl. 604-81.000.
Bradshaw, Thomas I.; Orensteen, Bruce D.; and Cook, Jack E., 4,714,656, Cl. 428-411.100.
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Minowa, Masahiro, to Seiko Epson Corporation. Print control device for a dot matrix printer. 4,714,363, Cl. 400-322.000.
Mircea, Andrei S. Reactor for vapor phase epitaxy. 4,714,594, Cl. 422-245.000.
Misra, Raj N., to E. R. Squibb & Sons, Inc. Arachidonic acid analogs. 4,714,714, Cl. 514-572.000.
Misumi, Masanori: *See*—
Oda, Hiroyuki; Nagao, Akihito; Misumi, Masanori; Yamashita, Akinori; and Okazaki, Katsumi, 4,714,063, Cl. 123-308.000.
Mita Industrial Co. Ltd.: *See*—
Iida, Kazumi; Ohata, Yosuke; Hyodo, Keiichiro; Akiyama, Kazunori; Umeda, Tadashi; and Kishimoto, Keiichi, 4,714,338, Cl. 355-3.0FU.
Mitsubishi Chemical Industries Limited: *See*—
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Mitsubishi Denki Kabushiki Kaisha: *See*—
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Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
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Mitsubishikaseikogyo Kabushiki Kaisha: *See*—
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Miyashita, Yoshinobu; Hamanaka, Tadashi; and Iwata, Kenzi, to Wako Pure Chemical Industries, Ltd. Stabilized sensitivity test disk. 4,714,675, Cl. 435-32.000.
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Miyazawa, Hideo; Andoh, Ikuhiro; Koyama, Hiromichi; and Kobayashi, Mitsuru, to Fujitsu Limited. Insulation displacement connection (IDC) type cable connector and a method for assembling a cable thereto. 4,714,306, Cl. 439-395.000.
Miyazono, Tadafumi; Eguchi, Yoshio; Ogino, Akiharu; Sawada, Haruhiko; and Okude, Yoshitaka, to Nippon Paint Co., Ltd. Preparation of graft copolymer and paint use thereof. 4,714,634, Cl. 427-409.000.
Mizobuchi, Yuzo: *See*—
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Davis, Benjamin L.; Dixon, Joseph M.; and Page, Nicholas D., 4,714,629, Cl. 427-138.000.
Driscoll, Patrick R.; and Kremer, Ross A., 4,714,600, Cl. 423-319.000.
Givens, Wyatt W., 4,714,881, Cl. 324-303.000.
Harandi, Mohsen N., 4,714,524, Cl. 196-98.000.
Herrington, Fox J., 4,714,454, Cl. 493-193.000.
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Jones, Lloyd G., 4,714,114, Cl. 166-280.000.
Jorgensen, Diane V.; Kennedy, Clinton R.; and Wong, Stephen S., 4,714,537, Cl. 208-111.000.
Kadash, Marjory A.; and Schwab, Frederick C., 4,714,658, Cl. 428-523.000.
Medlin, William L.; and Zumwalt, Gary L., 4,715,019, Cl. 367-31.000.
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Uhri, Duane C., 4,714,115, Cl. 166-308.000.
Yale, David P., 4,713,968, Cl. 73-594.000.
Mobley, Lawrence R.; Nordstrom, Mark B.; and Winter, Roger D., to Samsonite Corporation. Handle assembly. 4,713,860, Cl. 16-111.00R.
Mochizuki, Takeshi; Iwasawa, Katsumasa; Shiraishi, Ikuya; and Terafuji, Kazuki, to Iwata Air Compressor Mfg. Co., Ltd. Automatic spraying method. 4,714,635, Cl. 427-421.000.
Moeller, Eckhard; Mueller, Wolfgang H. E.; and Hausen, Manfred Z., to Huls Aktiengesellschaft. Method for removing n-butyraldehyde from gas streams. 4,714,784, Cl. 568-492.000.
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Mohnot, Shantilal M.; and Chakrabarti, Paritosh M., to PPG Industries, Inc. Alkaline water flooding with a precipitation inhibitor for enhanced oil recovery. 4,714,113, Cl. 166-270.000.
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Moore, Wayne E.; Quinn, Stephen R.; Tufts, Wesley M.; and Gasko, William F., to Aster Associates. Optical fiber unit having protective assembly. 4,714,316, Cl. 350-96.200.
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Moroto, Shuzo; Sumiya, Koji; Watanabe, Kazuaki; Kubo, Seitoku; Kobayashi, Koji; and Taga, Yutaka, to Aisin-Warner Limited; and Toyota Jidosha Kabushiki Kaisha. Friction coupling element of automatic transmission. 4,714,146, Cl. 192-85.0AA.

Morris, David B.; Rollett, Andrew C.; and Roberts, Donald M., to Bayer Aktiengesellschaft. Device for the metering of a chemical, particularly for seed treatment. 4,714,177, Cl. 222-58.000.

Morris, James R.; and White, James A., to Miles Inc. Test strip identification and instrument calibration. 4,714,874, Cl. 324-65.00R.

Morris, John M., to GT Development Corporation. Vapor recovery systems. 4,714,172, Cl. 220-86.00R.

Morris, Lawrence E.: *See*—
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Morrison, Charles F., Jr., to Granville-Phillips Company. Method and apparatus for improving the safety and extending the range of ionization gauge systems. 4,714,891, Cl. 324-459.000.

Morrison, Elbert F.; Bradley, Danny R.; and Reece, D. C., to Burlington Industries, Inc. Apparatus for vacuum spinning. 4,713,931, Cl. 57-328.000.

Morrison, Herbert M.; and Del Mar, Jorge, to Clairol Incorporated. Electrically heated curling wrapper. 4,714,820, Cl. 219-222.000.

Morrocco, Diane M. Fast food take out carton with cover. 4,714,190, Cl. 229-1.50B.

Morrone, James V. Media storage apparatus. 4,714,157, Cl. 206-309.000.

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Moser, Franz: *See*—
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Brand, Jerry C., 4,714,903, Cl. 333-110.000.
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Haddad, Kenneth R.; and Vilmur, Richard J., 4,715,063, Cl. 379-390.000.
Kurtzman, Gary; Heck, Joseph P.; Hansen, Kenneth A.; Enderby, Ralph; and Vidugiris, Bronis, 4,714,899, Cl. 331-1.00A.
Lang, Warren R., 4,714,983, Cl. 362-27.000.
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Marabotto, Eduardo J.; Bresin, Mark S.; and Drake, Bick R., 4,714,439, Cl. 439-627.000.
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Tassle, C. R. V.; and Freeburg, Thomas A., 4,714,923, Cl. 340-825.060.

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Bender, Wolfgang; Mrotzek, Dieter; Koglin, Bernd; and Steiner, Karl-Heinz, 4,714,456, Cl. 494-36.000.

MTU Motoren-und Turbinen Union Muenchen GmbH: *See*—
Lorenz, Joachim; and Gattinger, Martin, 4,714,139, Cl. 184-6.110.

Mueller, Otto, Jr., to Massey-Ferguson Services N.V. Electronic tractor control. 4,715,012, Cl. 364-900.000.

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Sasaki, Noboru; Iwata, Yasuji; and Mukai, Teruo, 4,713,956, Cl. 72-137.000.

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Murayama, Akira: *See*—
Mizuno, Takao; Uchikawa, Naoshi; Murayama, Akira; Tamura, Takahiro; and Kuroshima, Ryoichi, 4,714,415, Cl. 418-14.000.

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Kato, Yasuo; Harada, Kunio; Kubota, Shigeo; Watanabe, Yoshio; and Murayama, Seiichi, 4,715,054, Cl. 378-122.000.

Musha, Tohru, to Olympus Optical Co., Ltd. Optical head with provision for tracking and focussing control. 4,715,024, Cl. 369-44.000.

Muto, Kazuhiko, to Canon Kabushiki Kaisha. Logarithmic compression circuit. 4,714,844, Cl. 307-494.000.

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Nabata, Yoshiyuki: *See*—
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Nabisco Brands, Inc.: *See*—
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Nachman, Frank J.: *See*—
Cotton, Dale L.; and Nachman, Frank J., 4,714,576, Cl. 264-46.500.

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Nagamoto, Itsushi; Nakanishi, Tatsuo; and Tajima, Ryohei, to Nippon Gakki Seizo Kabushiki Kaisha. Method for producing a wood-type golf club head. 4,714,577, Cl. 264-46.600.

Nagano, Hiroo: *See*—
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Nagano, Shuji: *See*—
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Yoshinaka, Toshio; and Nagano, Shuji, 4,714,128, Cl. 180-247.000.

Nagao, Akihito: *See*—
Oda, Hiroyuki; Nagao, Akihito; Misumi, Masanori; Yamashita, Akinori; and Okazaki, Katsumi, 4,714,063, Cl. 123-308.000.

Nagarwalla, Pheroze J.: *See*—
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Nagase, Masaomi; Takemoto, Eiji; Ibuki, Noritaka; and Hasegawa, Takashi, to Toyota Jidosha Kabushiki Kaisha. Method and device for controlling fuel injection quantity of electronic control diesel engine. 4,714,068, Cl. 123-506.000.

Nagashima, Hideyuki, to Nissan Motor Co., Ltd. Seat belt retractor. 4,714,274, Cl. 280-801.000.

Nagata, Satoshi, to Canon Kabushiki Kaisha. Image forming apparatus. 4,715,006, Cl. 364-523.000.

Nagata, Yasuhisa, to Toho Rayon Co., Ltd. Prepregs and method for production thereof. 4,714,648, Cl. 428-245.000.

Nagayama, Kuniaki, to JEOL, Ltd. Two-dimensional nuclear magnetic resonance spectroscopy method. 4,714,882, Cl. 324-307.000.

Nagoya Oilchemical Co., Ltd.: *See*—
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Nahas, Randall E.: *See*—
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Naik, Subhash K., to Textron/Avco Corp. High temperature oxidation/corrosion resistant coatings. 4,714,624, Cl. 427-34.000.

Naito, Akio; Uozu, Hirohisa; and Numaguchi, Toru, to Toyo Engineering Corporation. Reforming apparatus. 4,714,593, Cl. 422-197.000.

Najvar, Daniel J.; Pope, Brian G.; and Loeffler, Norman R., to Dow Chemical Company, The. Fly ash reactive filler for dehydrating and bonding aqueous polymeric compositions. 4,714,722, Cl. 523-218.000.
Nakagawa, Reiji: *See*—
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Nakajima, Shigeo: *See*—
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Nakamura Koki Co., Ltd.: *See*—
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Nakamura, Toshiyuki: *See*—
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Nakanishi, Akio, to Fujitsu Limited. Reversal image development type electrophotographic printing system. 4,714,942, Cl. 355-14.00R.
Nakanishi, Katsumi: *See*—
Yasuda, Keiji; Oda, Yukihisa; Hamajima, Shigemitsu; Ishii, Masami; Nakanishi, Katsumi; Tsuzuki, Takayoshi; and Tsuda, Jyou, 4,714,804, Cl. 200-11.0DA.
Nakanishi, Tatsuo: *See*—
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Nakanishi, Yutaka; Yamada, Toshihiko; Sanada, Yuji; and Kawai, Takashi, to Toyotomi Kogyo Co., Ltd. Ignition system for oil burner. 4,714,426, Cl. 431-132.000.
Nakao, Kunimichi, to Fujitsu Limited. Method and apparatus for adhering a tape or sheet to a semiconductor wafer. 4,714,511, Cl. 156-285.000.
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Nakayama, Yoshiharu; and Ohnishi, Youichi, to Yamaha Hatsudoki Kabushiki Kaisha. Inline multiple cylinder engine for motorcycles. 4,714,061, Cl. 123-195.00R.
Namba, Masato: *See*—
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Namiki, Tetsuro; Furuse, Masayasu; Kuroyanagi, Yoshimitsu; and Miyata, Teruo, to Koken Co., Ltd. Surfactant composed of acylated collagen or acylated gelatine and a production process thereof. 4,714,758, Cl. 530-354.000.
Nanri, Seiji: *See*—
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Narr, Berthold: *See*—
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National Institute for Researches in Inorganic Materials: *See*—
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National Research Development Corporation: *See*—
Cripps, Martin D.; and Field, Anthony J., 4,714,922, Cl. 340-825.000.
Hartog, Arthur H.; and Payne, David N., 4,714,829, Cl. 250-227.000.
Perry, Forbes G. D. B., 4,713,978, Cl. 74-200.000.
National Rolling Mills Inc.: *See*—
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National Tool & Manufacturing Co., Inc.: *See*—
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Naya, Kotaro: *See*—
Matsubara, Katsumi; Uchida, Riichi; Muramatsu, Masatoshi; Naya, Kotaro; and Takagi, Tsuneharu, 4,714,418, Cl. 418-201.000.
NCR Corporation: *See*—
Claessen, Albertus M. G., 4,715,064, Cl. 379-392.000.
Gay, Richard B.; and Crafts, Harold S., 4,714,876, Cl. 324-73.00R.
NDT Instruments, Inc.: *See*—
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Takekawa, Kouichi; and Bonkohara, Manabu, 4,714,952, Cl. 357-75.000.
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Neumeyer, Lowell H., to Deere & Company. Shank-mounted press wheel assembly. 4,714,033, Cl. 111-85.000.
Neuner, James A.; and Boomgaard, Dirk J., to Westinghouse Electric Corp. Rod position indication system with temperature compensation. 4,714,926, Cl. 340-870.360.
New York Society for the Relief of the Ruptured and Crippled: *See*—
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Dechene, Ronald L.; and Newton, Robert E., 4,714,890, Cl. 324-454.000.
Newton, Walter A., to Entravision, Inc. Mechanism for coupling the aspirant line of an irrigation/aspiration machine to the pressure monitoring section. 4,714,464, Cl. 604-118.000.
NGK Insulators, Ltd.: *See*—
Hattori, Isao; and Furukawa, Shigeru, 4,714,423, Cl. 425-376.00R.
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Fernandes, Roosevelt A.; Smith-Vaniz, William R.; Burbank, John E., III; and Sieron, Richard L., 4,714,893, Cl. 324-126.000.
Nichols, David J., to Garland Commercial Ranges Limited. Pre-heater. 4,714,050, Cl. 122-13.00R.
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Nicolas, Jean-Marie C.: *See*—
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Nicollini, Germano; and Senderowicz, Daniel, to SGS Microelettronica SpA. Internal all-differential operational amplifier for CMOS integrated circuits. 4,714,895, Cl. 330-258.000.
Nidiffer, Charles A.; and Van Camp, Raymond E., to Bunn-O-Matic Corporation. Bag-receiving chute for coffee grinder. 4,714,206, Cl. 241-100.000.
Nielsen, A. Lamont. Candy dispensing apparatus. 4,714,419, Cl. 425-126.00S.
Nieto, Augustine: *See*—
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Nightingale, Douglas J.: *See*—
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Nigrini, Andrew; and Hsueh, Liming, to Chevron Research Company. Method for controlling rock dissolution and pipe corrosion during oil well steam injection. 4,714,112, Cl. 166-252.000.
Nilsson, Alf B., to Aktiebolaget Electrolux. Arrangement for controlling an A.C. voltage. 4,714,870, Cl. 323-258.000.
Nilsson, Olof E., to Telefonaktiebolaget LM Ericsson. Method and apparatus for the connection of a closed ring through a telephone exchange. 4,715,032, Cl. 370-86.000.
Nimco Corporation: *See*—
Bachner, George, 4,714,164, Cl. 206-518.000.
Nippon Colin Co., Ltd.: *See*—
Edgar, Reuben W., Jr.; Gilstad, Dennis W.; and Branstetter, Ronald L., 4,714,080, Cl. 128-633.000.
Nippon Denso Co., Ltd.: *See*—
Araki, Masatada; Kuroyama, Yutaka; Takeuchi, Yukihisa; Takagi, Makoto; and Imura, Toru, 4,713,871, Cl. 29-421.00E.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
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Nippon Kogaku K. K.: *See*—
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Nippon Oil Co., Ltd.: *See*—
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Nippon Oil & Fats Co., Ltd.: *See*—
Araki, Masatada; Kuroyama, Yutaka; Takeuchi, Yukihisa; Takagi, Makoto; and Imura, Toru, 4,713,871, Cl. 29-421.00E.
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Miyazono, Tadafumi; Eguchi, Yoshio; Ogino, Akiharu; Sawada, Haruhiko; and Okude, Yoshitaka, 4,714,634, Cl. 427-409.000.
Nippon Soken, Inc.: *See*—
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Nippondenso Co., Ltd.: *See*—
Imoto, Yuzo; Wakata, Hideo; Takei, Toshihiro; and Hattori, Yoshiyuki, 4,714,296, Cl. 303-6.00C.
Yogo, Kazutoshi; and Wakata, Hideo, 4,714,864, Cl. 318-52.000.
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Nishimura, Ryuji; Kato, Minoru; Noda, Masaru; and Imaide, Takuya, to Hitachi, Ltd. Solid-state color image pickup apparatus. 4,714,955, Cl. 358-48.000.
Nishimura, Tadashi: *See*—
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Nishino, Hiroshi; and Okabe, Kazuo, to Toska Co., Ltd. Process for preparing conductive coating composition. 4,714,569, Cl. 252-511.000.
Nishiyama, Yukinori: *See*—
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Nissan Motor Co., Ltd.: *See*—
Abe, Takeshi, 4,714,408, Cl. 416-91.000.
Nagashima, Hideyuki, 4,714,274, Cl. 280-801.000.
Sasaki, Michiaki; and Ohno, Junya, 4,714,171, Cl. 220-85.0VR.
Nissho Seiko Kabushiki Kaisha: *See*—
Ohno, Seishichi, 4,714,387, Cl. 409-51.000.
Nisson Motor Co., Ltd.: *See*—
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Nitro Nobel AB: *See*—
Lofgren, Lars-Gunnar, 4,714,018, Cl. 102-275.700.
NL Industries, Inc.: *See*—
Russell, Michael K.; and Arlott, Colin, 4,714,403, Cl. 415-107.000.
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Back, Sigurd; and Nyqvist, Jan-Olof, 4,714,572, Cl. 264-3.400.
Noda, Masaru: *See*—
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Noda, Shigeru: *See*—
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Noding, Stephen A.: *See*—
Siegel, Sanford A.; and Noding, Stephen A., 4,714,665, Cl. 429-192.000.
Noehren, William L.: *See*—
Byrnes, Francis E.; Ferris, Donald L.; Hibyan, Edward S.; Noehren, William L.; and Ogle, Peter C., 4,714,450, Cl. 464-90.000.
Nohara, Akira; and Maki, Yoshitaka, to Takeda Chemical Industries, Ltd. Benzoic acid derivatives and their production. 4,714,774, Cl. 560-053.000.
Nolff, Douglas: *See*—
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Norden, Alexander R. Terminal block with circuit marker. 4,714,434, Cl. 439-488.000.
Nordstrom, Mark B.: *See*—
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Normalair-Garrett (Holdings) Limited: *See*—
Searle, Robin H. J., 4,714,411, Cl. 417-246.000.
Nortey, Narku O., to Farrel Corporation. Two-wing non-intermeshing rotors of increased performance for use in internal batch mixing machines. 4,714,350, Cl. 366-84.000.
Northrop Corporation: *See*—
Yavari, Parviz, 4,713,953, Cl. 72-60.000.
Norwich, Daniel, to Telecredit, Inc. Coordinated multiple telephone station system. 4,715,061, Cl. 379-91.000.
Nose, Hiroyasu: *See*—
Usui, Masayuki; Imataki, Hiroyuki; Serizawa, Takashi; Baba, Takeshi; and Nose, Hiroyasu, 4,714,326, Cl. 350-485.000.
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Force, Christian; and Lescure, Alain, 4,714,229, Cl. 248-610.000.
Novorsky, Donald E.: *See*—
Hammond, Michael R.; and Novorsky, Donald E., 4,714,809, Cl. 219-10.430.
Nowakowski, Robert J.: *See*—
Groth, Ronald W.; and Nowakowski, Robert J., 4,714,357, Cl. 384-312.000.
Nuerrenbach, Axel: *See*—
Wuesi, Hans-Heiner; Janssen, Bernd; Frickel, Fritz-Frieder; and Nuerrenbach, Axel, 4,714,786, Cl. 568-633.000.
Numaguchi, Toru: *See*—
Naito, Akio; Uozu, Hirohisa; and Numaguchi, Toru, 4,714,593, Cl. 422-197.000.
N.V. Optimed: *See*—
Hellstrom, Lars, 4,714,329, Cl. 351-158.000.
Nycomed AS: *See*—
Klaveness, Jo, 4,714,607, Cl. 424-9.000.
Nyqvist, Jan-Olof: *See*—
Back, Sigurd; and Nyqvist, Jan-Olof, 4,714,572, Cl. 264-3.400.
Oakes, Alan E., to Digital Equipment Corporation. Data encoder system. 4,715,036, Cl. 371-37.000.
Oates, Danny R., to Conoco Inc. Adapter bracket for making a valve fire safe. 4,714,233, Cl. 251-14.000.
Oba, Hideaki: *See*—
Sato, Tsutomu; Umehara, Masaakira; Abe, Michiharu; Oba, Hideaki; and Ueda, Yutaka, 4,714,667, Cl. 430-270.000.
Oba, Koichiro, to Hamamatsu Photonics Kabushiki Kaisha. System for calibrating the time axis of an X-ray streak tube. 4,714,825, Cl. 250-213.0VT.
Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, to Hiraoka & Co., Ltd. Stainproof, flame-resistant composite sheet material. 4,714,650, Cl. 428-265.000.
Oboshi, Fumio: *See*—
Omori, Shigeru; Watanabe, Masatsugu; and Oboshi, Fumio, 4,714,622, Cl. 427-11.000.
Oce-Nederland B.V.: *See*—
Wijnen, Peter J. A., 4,714,176, Cl. 222-51.000.
Ocean Engineering Systems, Pty., Ltd.: *See*—
Lincoln, John B., 4,714,378, Cl. 405-163.000.
Ochiai, Takashi: *See*—
Inoue, Ichizo; Oine, Toyonari; Yamada, Yoshihisa; Ishida, Ryuichi; and Ochiai, Takashi, 4,714,702, Cl. 514-259.000.
Oda, Hiroyuki; and Kageyama, Akira, to Mazda Motor Corporation. Spark-ignited internal combustion engine. 4,714,058, Cl. 123-90.220.
Oda, Hiroyuki; Nagao, Akihito; Misumi, Masanori; Yamashita, Akinori; and Okazaki, Katsumi, to Mazda Motor Corporation. Intake system for internal combustion engine. 4,714,063, Cl. 123-308.000.
Oda, Hiroyuki: *See*—
Masuda, Shuji; and Oda, Hiroyuki, 4,714,059, Cl. 123-90.230.
Oda, Kazuyuki; Yui, Yoshikiyo; Kataoka, Yoshiharu; and Hata, Hideo, to Canon Kabushiki Kaisha. Method and apparatus for automatic focusing. 4,714,331, Cl. 353-122.000.
Oda, Yukihisa: *See*—
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Ogasawara, Joji: *See*—
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, 4,714,791, Cl. 568-913.000.
Ogawa, Kazuo; and Honna, Takaji, to Taiho Pharmaceutical Company, Limited. Rhodanine derivatives and process for preparing the same. 4,714,765, Cl. 548-183.000.
Ogino, Akiharu: *See*—
Miyazono, Tadafumi; Eguchi, Yoshio; Ogino, Akiharu; Sawada, Haruhiko; and Okude, Yoshitaka, 4,714,634, Cl. 427-409.000.
Oginz, Stanley. Modular tongue and groove removable panel partition system. 4,713,920, Cl. 52-582.000.
Ogle, Peter C.: *See*—
Byrnes, Francis E.; Ferris, Donald L.; Hibyan, Edward S.; Noehren, William L.; and Ogle, Peter C., 4,714,450, Cl. 464-90.000.
Oguri, Shigenori, to Nippon Gakki Seizo Kabushiki Kaisha. Automatic rhythm apparatus with tone level dependent timbres. 4,713,996, Cl. 84-1.030.
Ohashi, Kaoru: *See*—
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,271, Cl. 280-707.000.
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,272, Cl. 280-707.000.
Ohata, Yosuke: *See*—
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Ohgushi, Yoshiyuki. Surface coating agent and method for using the same in civil and construction engineering. 4,714,507, Cl. 156-91.000.
Ohira, Yohichi: *See*—
Okada, Yoshio; Akatsu, Masahiro; and Ohira, Yohichi, 4,714,495, Cl. 106-21.000.
Ohkubo, Masahiro, to Kabushiki Kaisha Daikin Seisakusho. Drive stage control mechanism for automatic transmission. 4,713,984, Cl. 74-732.000.
Ohkubo, Yukitoshi: *See*—
Yokono, Koujiro; Kamio, Masaru; and Ohkubo, Yukitoshi, 4,714,636, Cl. 428-1.000.
Ohkuma, Kuniaki; Nakagawa, Reiji; Miyao, Hisao; Yoshimura, Shinichi; Suzuki, Toshio; Hayashi, Toyoaki; Arakawa, Masayasu; and

Koizumi, Hideharu, to Honda Giken Kogyo Kabushiki Kaisha. Automatic parts feeder. 4,714,397, Cl. 414-222.000.

Ohkuma, Osamu: *See*—
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.

Ohnishi, Youichi: *See*—
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Ohno, Junya: *See*—
Sasaki, Michiaki; and Ohno, Junya, 4,714,171, Cl. 220-85.0VR.

Ohno, Seishichi, to Nissho Seiko Kabushiki Kaisha. Gear cutting process. 4,714,387, Cl. 409-51.000.

Ohnuki, Ichiro: *See*—
Eguchi, Masaharu; Tosaka, Yoichi; Ohnuki, Ichiro; Aihara, Yoshihiko; and Ishizaki, Akira, 4,714,332, Cl. 354-21.000.

Ohta, Minoru: *See*—
Ikeda, Hirotane; Hattori, Tadashi; Ohta, Minoru; and Mukainakano, Shinichi, 4,714,047, Cl. 118-724.000.

Ohzawa, Toshio: *See*—
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.

Oine, Toyonari: *See*—
Inoue, Ichizo; Oine, Toyonari; Yamada, Yoshihisa; Ishida, Ryuichi; and Ochiai, Takashi, 4,714,702, Cl. 514-259.000.

Okabe, Kazuo: *See*—
Nishino, Hiroshi; and Okabe, Kazuo, 4,714,569, Cl. 252-511.000.

Okada, Munehisa: *See*—
Matsuura, Junichi; and Okada, Munehisa, 4,714,481, Cl. 55-158.000.

Okada, Shinjiro: *See*—
Katagiri, Kazuharu; Yoshinaga, Kazuo; Okada, Shinjiro; and Kanbe, Junichiro, 4,714,323, Cl. 350-350.00S.

Okada, Yaautaka: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yaautaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.

Okada, Yoshio; Akatsu, Masahiro; and Ohira, Yohichi, to Kupeha Kagaku Kogyo Kabushiki Kaisha. Solvent, ink and coated paper for carbonless copying system. 4,714,495, Cl. 106-21.000.

Okamoto, Ichiro: *See*—
Shibata, Tohru; and Okamoto, Ichiro, 4,714,555, Cl. 210-635.000.

Okazaki, Katsumi: *See*—
Oda, Hiroyuki; Nagao, Akihito; Misumi, Masanori; Yamashita, Akinori; and Okazaki, Katsumi, 4,714,063, Cl. 123-308.000.

Oki, Kenji: *See*—
Tottori, Takumi; Oki, Kenji; Ooyama, Kazuo; and Mizushima, Toshio, 4,714,056, Cl. 123-65.0PE.

Okinaka, Hideyuki: *See*—
Nakatani, Seiichi; Yuhaku, Satoru; Okinaka, Hideyuki; Ishida, Toru; Makino, Osamu; and Kikuchi, Tatsuro, 4,714,570, Cl. 252-518.000.

Okino, Tadashi: *See*—
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Okishi, Yoshio: *See*—
Takeuchi, Makoto; Kitazumi, Etsuo; Sakaki, Hirokazu; and Okishi, Yoshio, 4,714,528, Cl. 204-33.000.

Oklobdzija, Vojin G.; and Ling, Daniel T., to International Business Machines Corp. Instruction prefetch buffer control. 4,714,994, Cl. 364-200.000.

Okude, Yoshitaka: *See*—
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Oldfelt, Sven; and Soderstrom, Sigvard, to Oy Wartsila Ab. Vacuum toilet system. 4,713,847, Cl. 4-316.000.

Olin Corporation: *See*—
Fair, David L.; Dean, Robert A.; and Sangster, Arlon G., 4,714,534, Cl. 204-269.000.

Olson, John E., to Cascade Corporation. Automatically-guided vehicle having load clamp. 4,714,399, Cl. 414-621.000.

Olson, Robert S., to Dow Chemical Company, The. Method of separating HF and SiF_4 from HCl. 4,714,604, Cl. 423-488.000.

Oltman, John P.; Sulentic, Donald N.; and Purchase, Richard D., to Waterloo Industries, Inc. Molded tool tray assembly. 4,714,158, Cl. 206-349.000.

Olympus Optical Co., Ltd.: *See*—
Musha, Tohru, 4,715,024, Cl. 369-44.000.
Takahashi, Naoyuki, 4,714,328, Cl. 350-521.000.

Omori, Shigeru; Watanabe, Masatsugu; and Oboshi, Fumio, to Dowa Iron Powder Co., Ltd. Blast material for mechanical plating and continuous mechanical plating using the same. 4,714,622, Cl. 427-11.000.

Oncogen: *See*—
Shoyab, Mohammed; Marquardt, Hans; and Todaro, George J., 4,714,683, Cl. 436-547.000.

Onimura, Kichiro: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yaautaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.

Onitsuka, Naganori, to Kabushiki Kaisha Toshiba. Excitation control apparatus for synchronous machine. 4,714,869, Cl. 322-20.000.

Onoda, Shigeyoshi: *See*—
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,714,337, Cl. 355-3.0DR.

Ontario Development Corp.: *See*—
Puddephatt, Richard J.; and Treurnicht, Ilse, 4,714,627, Cl. 427-53.100.

Onuma, Toshio: *See*—
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,271, Cl. 280-707.000.
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,272, Cl. 280-707.000.

Ooyama, Kazuo: *See*—
Tottori, Takumi; Oki, Kenji; Ooyama, Kazuo; and Mizushima, Toshio, 4,714,056, Cl. 123-65.0PE.

Orcon Corporation: *See*—
Hoopengardner, Merle R., 4,714,514, Cl. 156-391.000.

Ordidge, Roger, to Oxford Research Systems Limited. Method and apparatus for obtaining localized NMR spectra. 4,714,883, Cl. 324-309.000.

Orensteen, Bruce D.: *See*—
Bradshaw, Thomas I.; Orensteen, Bruce D.; and Cook, Jack E., 4,714,656, Cl. 428-411.100.

Orion Corporation: *See*—
Groth, Ronald W.; and Nowakowski, Robert J., 4,714,357, Cl. 384-312.000.

Ortho Pharmaceutical Corporation: *See*—
Kanojia, Ramesh M.; Falotico, Robert; Tobia, Alfonso J.; and Press, Jeffery B., 4,714,705, Cl. 514-309.000.

Oscar Mayer Foods Corporation: *See*—
Hartl, Carroll P.; and Heitman, James M., 4,714,014, Cl. 99-450.200.

Oshima, Jinichiro, to Seiko Seiki Kabushiki Kaisha. Internal grinding method. 4,713,914, Cl. 51-281.00P.

Oshita, Kiyoshi: *See*—
Hoashi, Jyuzaemon; Fumoto, Syozo; and Oshita, Kiyoshi, 4,714,748, Cl. 526-255.000.

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Averill, Robert G.; Khowaylo, Alex; and Sidebotham, Christopher G., 4,714,472, Cl. 623-20.000.

Ostiz, Jean-Claude: *See*—
Vernon, Patrick; and Ostiz, Jean-Claude, 4,715,002, Cl. 364-422.000.

Ota, Yoshiji: *See*—
Mimoto, Toshio; and Ota, Yoshiji, 4,715,015, Cl. 365-210.000.

Otterstetter, Charles H.; Schowiak, Duane C.; and Stueckle, Paul, to Ford Motor Company. Positive displacement paint pushout apparatus. 4,714,179, Cl. 222-148.000.

Otto, Bernard, to Mobil Oil Corporation. Coaxial, dual chamber seismic air gun. 4,715,023, Cl. 367-144.000.

Ouchi, Yutaka; Sugino, Akio; Sugaya, Kazuo; and Kimizima, Kazuo, to Hitachi Cable, Ltd. Method of continuously casting a metal and an apparatus for continuously casting the same. 4,714,104, Cl. 164-504.000.

Oudet, Claude, to Portescap. Electric motor with a multipolar permanent magnet rotor. 4,714,854, Cl. 310-268.000.

Overs, Ronald R.; and Wobshall, Darold, to Overs, Ronald R. Method and apparatus for measuring a water condition. 4,713,967, Cl. 73-170.00A.

Ovonic Imaging Systems, Inc.: *See*—
Kitamura, Koichi; Swartz, Louis D.; Catchpole, Clive; and Yaniv, Zvi, 4,714,836, Cl. 250-578.000.

Ovren, Christer: *See*—
Brogardh, Torgny; Hok, Bertil; and Ovren, Christer, 4,714,835, Cl. 250-486.100.

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Coombes, Robert L., Jr.; Owen, Merrill J.; Colwell, Terance C.; and Walker, Donald E., 4,714,535, Cl. 204-297.00W.

Owens-Illinois Glass Container Inc.: *See*—
Keyes, Melvin H., 4,714,676, Cl. 435-176.000.
Keyes, Melvin H., 4,714,677, Cl. 435-183.000.

Owens-Illinois Plastic Products Inc.: *See*—
Balduff, Dennis C.; and Jabarin, Saleh A., 4,714,741, Cl. 525-185.000.

Oxford Research Systems Limited: *See*—
Ordidge, Roger, 4,714,883, Cl. 324-309.000.

Oy Fiskars AB: *See*—
Linden, Olavi, 4,714,159, Cl. 206-349.000.

Oy Wartsila Ab: *See*—
Oldfelt, Sven; and Soderstrom, Sigvard, 4,713,847, Cl. 4-316.000.

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P. F. Medicament: *See*—
Cousse, Henri; Delhon, Andre ; Rieu, Jean-Pierre; and Patoiseau, Jean-Francois, 4,714,789, Cl. 568-807.000.

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Cecil, Don R.; and Evans, Richard P., 4,713,857, Cl. 15-97.00R.

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Heinrich, Juergen; Krauth, Axel; Victor, Karl-Heinz; and Peeken, Heinz, 4,714,257, Cl. 277-1.000.

Pacyna, David A.: *See*—
Minard, Paul G.; Alba, James; and Pacyna, David A., 4,714,054, Cl. 122-483.000.

Paddock, Gordon R.: *See*—
Covert, Charles H.; Gifford, William E.; Kemler, Craig G.; and Paddock, Gordon R., 4,714,485, Cl. 55-189.000.

Page, Nicholas D.: *See*—
Davis, Benjamin L.; Dixon, Joseph M.; and Page, Nicholas D., 4,714,629, Cl. 427-138.000.
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Korsky, Vincent V.; and Pajer, Raymond T., 4,715,062, Cl. 379-390.000.
Pakway Container Corp.: *See*—
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Palmer, John M., to Pilkington P.E. Limited. Catadioptric infrared lenses. 4,714,307, Cl. 350-1.300.
Palmero, Albert; and Hansen, Charles, to Tri-tech, Inc. Low profile electric motor. 4,714,853, Cl. 310-257.000.
Palmin, Simyon; and Shlain, Vladimir, to Design Components Incorporated. Method and apparatus for controlling a stepper motor with a programmable parabolic velocity profile. 4,714,867, Cl. 318-696.000.
Paltiel, Zvi; and Ban, Amir, to Elscint Ltd. Magnetic resonance imaging. 4,714,885, Cl. 324-312.000.
Paluch, Bernard R. Insert for heated humidifier used in respiratory therapy. 4,714,078, Cl. 128-203.170.
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Hopper, Roger J.; and Parks, Carl R., 4,714,742, Cl. 525-346.000.
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Murari, Bruno; Pasetti, Mauro; and Rossetti, Nazzareno, 4,714,897, Cl. 330-288.000.
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Wurster, Ewald, 4,714,986, Cl. 362-267.000.
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Patterson, Dwight J., to General Electric. Process and composition. 4,714,737, Cl. 524-611.000.
Patterson, Jerusha A. Protective multiple feeding means garment. 4,713,842, Cl. 2-104.000.
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Hartog, Arthur H.; and Payne, David N., 4,714,829, Cl. 250-227.000.
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Pesque, Patrick R.; and Nicolas, Jean-Marie C., to U.S. Philips Corporation. Apparatus for the examination of objects with ultra-sound, comprising an array of piezo-electric transducer elements. 4,714,846, Cl. 310-317.000.
Peters, Joerg: *See*—
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Petersen, Karl: *See*—
Hofmeier, Gerhard; Petersen, Karl; and Schroeder, Wolfgang, 4,714,527, Cl. 204-1.00T.
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Andrews, George E.; Davis, Paul C.; Farley, Dennis C.; Kravitz, Stanley H.; Meeker, Thrygve R.; Petersen, Owe G.; and Schelling, Arthur W., 4,715,049, Cl. 375-106.000.
Peterson, Rudolph A., Jr.: *See*—
Holm, David R.; and Peterson, Rudolph A., Jr., 4,714,227, Cl. 248-595.000.
Petrarch Systems Inc.: *See*—
Arkles, Barry C., 4,714,739, Cl. 525-92.000.
Petri A.G.: *See*—
Zeller, Gregor, 4,714,430, Cl. 439-15.000.
Petros, Andrew. Thrust mechanism for mill roll bearing assembly. 4,714,360, Cl. 384-620.000.
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Pfeifer, Josef; and Duthaler, Rudolf, to Ciba-Geigy Corporation. Radiation-sensitive polycondensates, their preparation, material coated therewith and the use thereof. 4,714,669, Cl. 430-325.000.
Pfiester, James R., to Motorola, Inc. Method for fabricating MOS transistors having gates with different work functions. 4,714,519, Cl. 437-81.000.
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Kenna, Robert V., 4,714,469, Cl. 623-17.000.
Wang, Kathy K.; Gustavson, Larry J.; and Dumbleton, John H., 4,714,468, Cl. 623-16.000.
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Carroll, Ronnie D.; and Volkmann, Robert A., 4,714,761, Cl. 540-310.000.
Vanderheiden, Dennis B., 4,714,603, Cl. 423-432.000.
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Gullberg, Carl E., 4,714,621, Cl. 427-2.000.
Phelps, Douglas W.: *See*—
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Duncan, George I.; and Phelps, Stephen L., 4,714,979, Cl. 361-274.000.
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DeHart, Marvin L.; and Johnson, Dale B., 4,714,009, Cl. 98-40.130.
Phillips, John W.: *See*—
Meston, Spencer D.; and Phillips, John W., 4,714,216, Cl. 244-3.290.
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Kamaya, Masashi, 4,714,223, Cl. 248-291.000.
Pierantozzi, Ronald: *See*—
Cabrera, Alejandro L.; Kirner, John F.; Miller, Robert A.; and Pierantozzi, Ronald, 4,714,632, Cl. 427-255.100.
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Palmer, John M., 4,714,307, Cl. 350-1.300.
Woodcock, Brian H.; and Duncan, Stuart S., 4,714,309, Cl. 350-3.700.
Pin, Bernard; Delbosse, Andre ; and Dubreucq, Ivan, to Gerin, Merlin. Multipole breaking device with remote control. 4,714,976, Cl. 361-114.000.
Pirl, William E.: *See*—
Arzenti, Thomas E.; and Pirl, William E., 4,714,289, Cl. 294-119.300.
Senger, Robert D.; Pirl, William E.; and Roth, Charles H., Jr., 4,713,952, Cl. 72-53.000.
Planek, Werner: *See*—
Bayer, Oswald; Grehn, Martin; and Planek, Werner, 4,714,358, Cl. 384-470.000.
Platt, William J., to National Rolling Mills Inc. Laser welded ceiling grid members. 4,713,919, Cl. 52-232.000.
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Michaelson, Robert C.; and Plotkin, Jeffrey S., 4,714,788, Cl. 568-697.000.
Plunkett, David O.: *See*—
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Pneumatic Scale Corporation: *See*—
Ross, Graham J., 4,714,152, Cl. 198-347.000.
Pneumo Corporation: *See*—
Tootle, James N.; and Martin, Eugene J., 4,714,006, Cl. 92-5.00R.
Polak, Anthony J.; and Young, Ping, to UOP Inc. Thin film polymer blend membranes. 4,714,482, Cl. 55-158.000.
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Mahapatra, Amaresh; and McMahon, Donald H., 4,715,027, Cl. 370-3.000.
McMahon, Donald H.; and Johnson, Gilbert L., Jr., 4,715,028, Cl. 370-3.000.

Satyanarayan, Arumugam; and Chin, Aland K., 4,714,518, Cl. 156-635.000.

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Poling, Denzil C. Bolt extracting tool. 4,713,990, Cl. 81-53.200.

Poloni, Alfredo; Drigani, Fausto; and Canzutti, Roberto, to Danieli & C. Officine Meccanichi SpA. Compensating device for rolling stands with rolls supported at only one end. 4,714,355, Cl. 384-193.000.

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Pool, James L., to Lisle Corporation. Front wheel drive boot removal tool. 4,713,869, Cl. 29-275.000.

Pope, Brian G.: *See*—
Najvar, Daniel J.; Pope, Brian G.; and Loeffler, Norman R., 4,714,722, Cl. 523-218.000.

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Popp, Walter: *See*—
Meissner, Ralph; and Popp, Walter, 4,714,887, Cl. 324-322.000.

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Oudet, Claude, 4,714,854, Cl. 310-268.000.

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Powers, Dale R., to Corning Glass Works. Apparatus for producing an optical fiber preform. 4,714,488, Cl. 65-13.000.

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Bennett, Terry A.; and Carino, James E., 4,714,489, Cl. 65-104.000.
Chang, Wen H.; Prucnal, Paul J.; Peffer, John R.; Dufford, Edward L.; and Ambrose, Ronald R., 4,714,738, Cl. 525-58.000.
Manner, James A., 4,714,785, Cl. 568-614.000.
Mohnot, Shantilal M.; and Chakrabarti, Paritosh M., 4,714,113, Cl. 166-270.000.

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Hubbard, Leo J.; and Kerivan, Leo J., 4,714,185, Cl. 226-74.000.

Premerlani, William J., to General Electric Company. Digital phase-locked loop and frequency measuring device. 4,715,000, Cl. 364-484.000.

Prentice, Daniel. Kite line take-up device. 4,714,217, Cl. 244-155.00R.

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Halpern, Howard J., 4,714,886, Cl. 324-316.000.

Press, Jeffery B.: *See*—
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Preston, Frank J., to Ex-Cell-O Corporation. Method for manufacturing RIM composites. 4,714,575, Cl. 264-46.400.

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Sandt, Hartley; and Happy, Henry, 4,714,377, Cl. 405-154.000.

Prisbylla, Michael P., to Stauffer Chemical Company. Diphenyl ether herbicides. 4,714,491, Cl. 71-86.000.

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Carr, Christopher; and Rembold, William T., 4,714,630, Cl. 427-207.100.
Kajs, Theresa M.; and Berge, Cynthia A., 4,714,563, Cl. 252-107.000.
Roselle, Brian J.; and Weatherby, Dennis W., 4,714,562, Cl. 252-94.000.
Wevers, Jean; Barrat, Christian R.; and Hardy, Frederick E., 4,714,565, Cl. 252-174.190.

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PTP Patentierte Technologische Prozesse AG: *See*—
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Quante, Heinrich, to ARMO Gesellschaft fur Bauelemente, Bau - und Wohnbedarf GmbH. Barrier post for parking lots and passageways. 4,713,910, Cl. 49-49.000.

Quinn, Clayton B.; McClish, Richard R.; and Moore, James E., to General Electric Company. Melamine based protective coatings for thermoplastic substrates. 4,714,657, Cl. 428-412.000.

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Raidel, John E. Wide base type suspension assembly with parallelogram torque beams and four air springs. 4,714,269, Cl. 280-683.000.

Raisin, Jean-Pierre; and Canaud, Alain, to Institut Textile DeFrance. Guiding device for the formation of a fold along the edge of a fabric. 4,714,036, Cl. 112-147.000.

Ramaciotti, Jean-Claude: *See*—
Bartolo, William; Boillot, Louis; Challande, Rene ; De Robertis, Patrick; Duchenaud, Jacky; and Ramaciotti, Jean-Claude, 4,714,907, Cl. 335-45.000.

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Randall, Kent A., to Eastman Kodak Company. Recirculating document feeder. 4,714,241, Cl. 271-3.100.

Ranke, Gerhard; and Siegert, Friedrich, to Linde Aktiengesellschaft. Process for obtaining C_{2+} or C_{3+} hydrocarbons from gaseous mixtures. 4,713,940, Cl. 62-17.000.

Rapoport, Morris, to Du Pont de Nemours, E. I., and Company. Hydrocyanation of butadiene. 4,714,773, Cl. 558-338.000.

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Rathmann, Dietrich: *See*—
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Ratz, Gerhard: *See*—
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Atkins, Alan D.; Elliott, Kenneth; and Looms, John S. T., 4,714,800, Cl. 174-73.00R.
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Gordon, Robert B., 4,714,981, Cl. 361-400.000.

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Reece, D. C.: *See*—
Morrison, Elbert F.; Bradley, Danny R.; and Reece, D. C., 4,713,931, Cl. 57-328.000.

Rees, Peter H.: *See*—
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Reinehr, Ulrich; Hirsch, Rolf-Burkhard; Dross, Joachim; and Jungverdorben, Hermann-Josef, to Bayer Aktiengesellschaft. Device for wetting threads, films or thread bundles with liquids. 4,714,045, Cl. 118-420.000.

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Ren, Ji T.: *See*—
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Rendel, Robert D. Drink can glider. 4,714,444, Cl. 446-61.000.

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Seltzman, Herbert H.; and Hsieh, Yung-Ao, 4,714,619, Cl. 426-548.000.

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Rey, Pierre; Abbou, Clement; Leandri, Jacqueline; and Sezeur, Alain J. P. R., to Centre National de la Recherche Scientifique. Method for protecting human or animal organs against radiation. 4,714,074, Cl. 128-1.100.
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Reynolds, David F.: *See*—
Lange, Ronald W.; Reynolds, David F.; Lolley, David R.; and Freeman, Gary L., 4,713,881, Cl. 29-724.000.
Reynolds, John H., IV: *See*—
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Rheinmetall GmbH: *See*—
Bocker, Jurgen; Klein, Klaus W.; Gersbach, Klaus; Sauvestre, Jean-Claude; and Montier, Patrick, 4,714,024, Cl. 102-521.000.
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Weinfurth, Udo, 4,714,004, Cl. 89-37.090.
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Ribitsch, Gert: *See*—
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Ricchio, Dominic A. Apparatus for improved water therapy. 4,713,853, Cl. 5-451.000.
Riccio, Louis M.; and Bosna, Alexander A. Method and apparatus for applying metal cladding on surfaces and products formed thereby. 4,714,623, Cl. 427-27.000.
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Satomi, Toyokazu, 4,714,354, Cl. 384-38.000.
Takada, Hiromi, 4,714,364, Cl. 400-639.100.
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Rider, Frederick H., Jr., to General Motors Corporation. Electrical connector with position assurance and double lock. 4,714,433, Cl. 439-310.000.
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Riker Laboratories, Inc.: *See*—
Bell, Randy L.; and Moore, George G. I., 4,714,776, Cl. 562-460.000.
Rimai, Donald S.: *See*—
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RJS Industries Inc: *See*—
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Robert Bosch GmbH: *See*—
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Bohringer, Wilfried; Eheim, Franz; Hofer, Gerald; Konrath, Karl; and Laufer, Helmut, 4,714,412, Cl. 417-289.000.
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Heess, Gerhard; Karnopp, Dean; and van Zanten, Anton, 4,714,300, Cl. 303-115.000.
Roberts, Charles G.: *See*—
Simmons, Arturo; Walsh, Shawn T.; and Roberts, Charles G., 4,714,949, Cl. 357-23.130.
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Roch, Josef; Heckel, Armin; Nickl, Josef; Muller, Erich; Narr, Berthold; Zimmermann, Rainer; and Weisenberger, Johannes, to Dr. Karl Thomae GmbH. 8-alkylthio-2-piperazino-pyrimido[5,4-d]-pyrimidines. 4,714,698, Cl. 514-212.000.
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Rokni, Mordechai; and Flusberg, Allen M., to AVCO Everett Research Laboratory, Inc. Gaseous non linear dispersion laser beam control. 4,714,902, Cl. 332-7.510.
Rokugawa, Kyuji; and Tamayama, Yasuko, to Kabushiki Kaisha Toshiba. Immunoassays involving complement lysing of chromophore containing microcapsules. 4,714,672, Cl. 435-7.000.
Rolla, Gunnar. Aqueous dental preparation containing fluoride ions and the use thereof. 4,714,608, Cl. 424-52.000.
Rollett, Andrew C.: *See*—
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Ros, Johannes F., to Innovative Concepts Europe B.V. Separable key holder. 4,713,951, Cl. 70-456.00R.
Rose, Harald; Zach, Joachim; and Lischke, Burkhard, to Siemens Aktiengesellschaft. Arrangement for detecting secondary and/or backscatter electrons in an electron beam apparatus. 4,714,833, Cl. 250-397.000.
Roselle, Brian J.; and Weatherby, Dennis W., to Procter & Gamble Company, The. Automatic dishwasher detergent composition. 4,714,562, Cl. 252-94.000.
Rosenthal, Arnold B.: *See*—
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Roser, Walter: *See*—
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Rosquist, Von D. Bed or bunk torsion spring suspension system. 4,713,851, Cl. 5-118.000.
Ross, Graham J., to Pneumatic Scale Corporation. Accumulator. 4,714,152, Cl. 198-347.000.
Ross, Mark S.: *See*—
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Ross, Stuart E.: *See*—
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Rossetti, Nazzareno: *See*—
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Roth, Philip M.; Itskovitch, Nathan M.; and Sussman, Arthur, to Intraspec, Inc. Automated dryer control system. 4,713,894, Cl. 34-30.000.

Rouse, Michael W.; Thelen, Robert L.; and Morison, John, to Waste Recovery, Inc. Tire processing apparatus and method. 4,714,201, Cl. 241-24.000.

Rowles, Howard C., to Air Products and Chemicals, Inc. Process for recovery and purification of C_3-C_4+ hydrocarbons using segregated phase separation and dephlegmation. 4,714,487, Cl. 62-24.000.

Rubens, Louis C.; and Alexander, Willard E., to Dow Chemical Company, The. Process and apparatus for packaging. 4,713,927, Cl. 53-472.000.

Rubini, Alfred: *See*—
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Rudolf, Hans-Werner: *See*—
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Ruiz, Guillermo E. Leak-proof closures. 4,714,173, Cl. 220-90.400.

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Rundle, Kenneth P. Wide range transmission. 4,713,983, Cl. 74-701.000.

Rupprich, Christian: *See*—
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Rushing, Allen J.: *See*—
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Russell, Michael K.; and Arlott, Colin, to NL Industries, Inc. Downhole devices for imparting rotary motion. 4,714,403, Cl. 415-107.000.

Ruzek, Ivo: *See*—
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RXS Schrumpftechnik-Garnituren GmbH: *See*—
Winterhoff, Hans, 4,714,280, Cl. 285-381.000.

Ryan, Allen: *See*—
Kolomayets, George; Ryan, Allen; Nieto, Augustine; and Andrus, Bryan, 4,714,244, Cl. 272-72.000.

Ryan, Daniel M.: *See*—
Fluegel, Theodore D.; and Ryan, Daniel M., 4,713,982, Cl. 74-686.000.

Ryobi American Corporation: *See*—
Holahan, Joseph M.; and Holahan, J. Myles, 4,714,208, Cl. 242-84.52B.

Ryoco Seiki Co., Ltd.: *See*—
Shimomura, Hiroshi; Iizuka, Kazuo; Harano, Makoto; and Hamada, Akifumi, 4,714,383, Cl. 407-42.000.

S & G Implants GmbH: *See*—
Grundei, Hans, 4,714,471, Cl. 623-20.000.
Grundei, Hans; and Aigner, Reinhard, 4,714,475, Cl. 623-20.000.

Sa "PGF"Procede de Galvanisation de Fils: *See*—
Poncelet, Andre ; Getti, Hyacinthe; and Faugouin, Michel, 4,714,626, Cl. 427-49.000.

Sabol, George P.: *See*—
Comstock, Robert J.; and Sabol, George P., 4,715,053, Cl. 378-73.000.

Saburi, Akio, to NEC Corporation. State information communication in a TDMA satellite communication network with high frame availability. 4,715,033, Cl. 370-104.000.

Saeki, Masaru: *See*—
Tanaka, Kiyoshi; Saeki, Masaru; Matsuishi, Tsutomu; Koga, Yoshihiro; and Kawakita, Tetsuya, 4,714,767, Cl. 548-344.000.

Saint-Gobain Vitrage: *See*—
Lenhardt, Karl, 4,714,425, Cl. 425-461.000.

Saint-Gobain Vitrage (Les Miroirs): *See*—
Guglielmetti, Giorgio; Carossio, Guido; and Gilli, Luigi, 4,713,994, Cl. 83-71.000.

St. Island Intl. Patent & Trademark Office: *See*—
Huang, Ming-Chien, 4,714,230, Cl. 248-613.000.

Saito, Mitsuo: *See*—
Kawajiri, Kazuhiro; Tamura, Hiroshi; Shinada, Haruji; Saito, Mitsuo; and Mizobuchi, Yuzo, 4,714,950, Cl. 357-30.000.

Saito, Syuichiro; and Okino, Tadashi, to Canon Kabushiki Kaisha. Electronic photography system with still and motion picture modes. 4,714,966, Cl. 358-335.000.

Sakai, Jun: *See*—
Sakakibara, Kenji; Akao, Michitoshi; Hayashi, Shigeyuki; and Sakai, Jun, 4,714,943, Cl. 355-27.000.

Sakai, Takao: *See*—
Hamaguri, Kenji; and Sakai, Takao, 4,714,341, Cl. 356-41.000.

Sakaki, Hirokazu: *See*—
Takeuchi, Makoto; Kitazumi, Etsuo; Sakaki, Hirokazu; and Okishi, Yoshio, 4,714,528, Cl. 204-33.000.

Sakakibara, Kenji; Akao, Michitoshi; Hayashi, Shigeyuki; and Sakai, Jun, to Brother Kogyo Kabushiki Kaisha. Imaging device. 4,714,943, Cl. 355-27.000.

Sakurada, Nobuaki: *See*—
Yamamoto, Mitsuru; Sakurada, Nobuaki; and Watanabe, Yoshitaka, 4,714,935, Cl. 346-140.00R.

Saliba, Frank. Handle and panel assembly for portfolio. 4,714,143, Cl. 190-115.000.

Sampson, David C., to BOC Group plc, The. Mixing apparatus for gases. 4,714,090, Cl. 137-636.000.

Samsonite Corporation: *See*—
Mobley, Lawrence R.; Nordstrom, Mark B.; and Winter, Roger D., 4,713,860, Cl. 16-111.00R.

Samuelsen, Sigvart J.: *See*—
Buller, Marvin L.; Lumbra, Douglas L.; Phelps, Douglas W.; Samuelsen, Sigvart J.; and Ward, William C., 4,714,953, Cl. 357-81.000.

Sanada, Yuji: *See*—
Nakanishi, Yutaka; Yamada, Toshihiko; Sanada, Yuji; and Kawai, Takashi, 4,714,426, Cl. 431-132.000.

Sander, Craig S.; and Swaminathan, Balaji, to Advanced Micro Devices, Inc. Method of forming contact plugs for planarized integrated circuits. 4,714,686, Cl. 437-195.000.

Sanders, George S., to Agricultural Aviation Engineering Company. Ball valve and flowing fluid pressure amplifier. 4,714,092, Cl. 137-894.000.

Sanders, Rudolf, to U.S. Philips Corporation. Capped electric lamp comprising a metal sleeve having a corner depression to engage an associated recess in an insulator body. 4,714,858, Cl. 313-318.000.

Sandhaus, Jeffrey. Plastic linerless closure. 4,714,167, Cl. 215-270.000.

Sandt, Hartley; and Happy, Henry, to Price Brothers Company, a part interest. Method of laying pipe sections. 4,714,377, Cl. 405-154.000.

Sangster, Arlon G.: *See*—
Fair, David L.; Dean, Robert A.; and Sangster, Arlon G., 4,714,534, Cl. 204-269.000.

Sano, Kiyoshi, to Matsushita Electric Industrial Co., Ltd. Quiet running compressor. 4,714,416, Cl. 418-63.000.

Sano, Yoshio: *See*—
Inui, Shuji; and Sano, Yoshio, 4,714,806, Cl. 200-61.550.

Santandrea, Luciano; and Luciani, Sabatino, to Axis S.p.A. Production line for pallet mounted electric motor stators. 4,713,883, Cl. 29-736.000.

Santiago, Julio A. Illuminated gunsight. 4,713,889, Cl. 33-241.000.

Santos, Llandro C.: *See*—
Amariti, Luigi; and Santos, Llandro C., 4,714,670, Cl. 430-331.000.

Santrade Limited: *See*—
Lagerberg, Stig E. V., 4,714,384, Cl. 407-103.000.
Stabler, Gerhard, 4,714,015, Cl. 100-154.000.

Sapino, Chet, Jr.: *See*—
Brundidge, Steven P.; Brodfuehrer, Paul R.; Sapino, Chet, Jr.; Shih, Kun M.; and Walker, Donald G., 4,714,760, Cl. 540-222.000.

Sasaguri, Nobuya: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yaautaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.

Sasaki, Masanori: *See*—
Watabe, Seiji; Yokoyama, Isao; Sasaki, Masanori; Toyoshima, Yotaro; Takahashi, Sumio; and Maeda, Tsutomu, 4,714,908, Cl. 335-212.000.

Sasaki, Michiaki; and Ohno, Junya, to Nissan Motor Co., Ltd. Fuel tank vent system. 4,714,171, Cl. 220-85.0VR.

Sasaki, Noboru; Iwata, Yasuji; and Mukai, Teruo, to France Bed Co., Ltd. Apparatus for manufacturing spring units. 4,713,956, Cl. 72-137.000.

Sasaki, Shuji: *See*—
Nakamura, Tsuneaki; Kiyoshige, Tatsuo; and Sasaki, Shuji, 4,714,612, Cl. 424-85.000.

Sasaki, Takashi, to Canon Kabushiki Kaisha. Intermediate gradient image forming method. 4,714,964, Cl. 358-298.000.

Sata, Hiroshi, to NEC Corporation. Current output circuit having well-balanced output currents of opposite polarities. 4,714,900, Cl. 331-8.000.

Sato, Nobukatsu; Kuraiyama, Haruo; and Agou, Masanobu, to Maruishi Seiyaku Kabushiki Kaisha. 2-(4-pyridylaminomethyl)-benzimidazole derivatives having antiviral activity. 4,714,764, Cl. 546-271.000.

Sato, Tadao; and Ishii, Toshihiko, to National Institute for Researches in Inorganic Materials. Process for preparing rhombohedral system boron nitride using $NaBH_4$-and NH_4Cl. 4,714,599, Cl. 423-290.000.

Sato, Tsutomu; Umehara, Masaakira; Abe, Michiharu; Oba, Hideaki; and Ueda, Yutaka, to Ricoh Co., Ltd. Optical information recording medium. 4,714,667, Cl. 430-270.000.

Satomi, Toyokazu, to Ricoh Company, Ltd. Support device for travel assembly. 4,714,354, Cl. 384-38.000.

Satyanarayan, Arumugam; and Chin, Aland K., to Polaroid Corporation. Dual layer encapsulation coating for III–V semiconductor compounds. 4,714,518, Cl. 156-635.000.

Saunders, Charles A. Sling attachment to an archery bow. 4,714,071, Cl. 124-88.000.

Sauron, Albert; and Smetanine, Alexandre. Balanced rotary seal ensuring tightness of a hydraulic turbine shaft. 4,714,258, Cl. 277-72.00R.

Sauvestre, Jean-Claude: *See*—
Bocker, Jurgen; Klein, Klaus W.; Gersbach, Klaus; Sauvestre, Jean-Claude; and Montier, Patrick, 4,714,024, Cl. 102-521.000.

Savkar, Sudhir D., to General Electric Company. Dual fuel single injector nozzle. 4,714,198, Cl. 239-409.000.

Sawada, Haruhiko: *See*—
Miyazono, Tadafumi; Eguchi, Yoshio; Ogino, Akiharu; Sawada, Haruhiko; and Okude, Yoshitaka, 4,714,634, Cl. 427-409.000.

Sawada, Kouji; Miura, Kiyokatsu; Suzuki, Keiichiro; Idosako, Hidetaka; and Kazusa, Hideo, to Toyota Jidosha Kabushiki Kaisha; and Ishikawa Tekko Kabushiki Kaisha. Bush with a spherical sliding surface. 4,714,368, Cl. 403-132.000.

Sawada, Saburo: *See*—
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.

Sawamura, Mitsuharu; and Taniguchi, Yasushi, to Canon Kabushiki Kaisha. Ultraviolet reflecting mirror. 4,714,308, Cl. 350-1.700.

Sawyer, Wilbur H.: *See—*
Manning, Maurice; and Sawyer, Wilbur H., 4,714,696, Cl. 514-11.000.

Sawyer, William D., Jr.; and Sawyer, William D., Sr. Suction roll seal strips with teflon insert. 4,714,523, Cl. 162-371.000.

Sawyer, William D., Sr.: *See—*
Sawyer, William D., Jr.; and Sawyer, William D., Sr., 4,714,523, Cl. 162-371.000.

Sayama, Shigeharu, to Kyushu Hitachi Maxell, Ltd. Nozzle for sprayer. 4,714,200, Cl. 239-579.000.

Schaefer, John G.; Aarestad, Jerome K.; and Whitesel, Terry L., to Sundstrand Corporation. Centrifugal pump. 4,714,405, Cl. 415-169.00R.

Schaefer, Louis F.: *See—*
Peppers, Norman A.; and Schaefer, Louis F., 4,714,310, Cl. 350-6.600.

Schaefer, Roland: *See—*
Franek, Henning; Broemer, Heinz; Deutscher, Klaus, deceased; and Schaefer, Roland, 4,714,721, Cl. 523-113.000.

Schafer, Ralf: *See—*
Dannert, Horst; Ganser, Hans-Gunther; Schafer, Ralf; and Stormberg, Hans-Peter, 4,714,862, Cl. 315-244.000.

Scheer, Wolfgang: *See—*
Lechner, Fritz; Heisaler, Herbert; Scheer, Wolfgang; Siebels, Wolfgang; and Ascherl, Rudolf, 4,714,467, Cl. 623-16.000.

Schelling, Arthur W.: *See—*
Andrews, George E.; Davis, Paul C.; Farley, Dennis C.; Kravitz, Stanley H.; Meeker, Thrygve R.; Petersen, Owe G.; and Schelling, Arthur W., 4,715,049, Cl. 375-106.000.

Schemmann, Hugo: *See—*
Bertram, Leo; and Schemmann, Hugo, 4,714,851, Cl. 310-156.000.

Scher, Frances M., to Colorado State University. Process for inducing suppressiveness to fusarium vascular wilt diseases. 4,714,614, Cl. 424-93.000.

Schering Aktiengesellschaft: *See—*
Franke, Heinrich; Joppien, Hartmut; and Franke, Helga, 4,714,710, Cl. 514-430.000.

Schiedel GmbH & Co.: *See—*
Januschkowetz, Gerhard, 4,713,944, Cl. 62-480.000.

Schleimann-Jensen, Lars J.; and Anderson, Fred H. E., to U.S. Philips Corporation. Apparatus for producing biaxial tiltable support for a rotational body. 4,714,214, Cl. 244-3.160.

Schlumberger Electronics (U.K.) Limited: *See—*
Tovey, Stuart J., 4,714,189, Cl. 228-122.000.

Schlumberger Technology Corporation: *See—*
Hebert, Joel J.; and Chuang, Jo-Yu, 4,714,119, Cl. 175-20.000.
Vernon, Patrick; and Ostiz, Jean-Claude, 4,715,002, Cl. 364-422.000.

Schmatz, Duane J.: *See—*
Novak, Robert F.; Schmatz, Duane J.; and Hunt, Thomas K., 4,714,798, Cl. 136-239.000.

Schmidt, Hans-Dieter: *See—*
Kuhl, Hans-Dieter; and Schmidt, Hans-Dieter, 4,714,484, Cl. 55-170.000.

Schmidt, Henning; Nedele, Walter; and Schmodde, Hermann, to H. Stoll GmbH & Co. Double bed flat knitting machine with sinkers located between the needles. 4,713,948, Cl. 66-106.000.

Schmitt, Jerry C. Radar altimeter static accuracy circuit. 4,714,928, Cl. 342-174.000.

Schmodde, Hermann: *See—*
Schmidt, Henning; Nedele, Walter; and Schmodde, Hermann, 4,713,948, Cl. 66-106.000.

Schneider, Joachim: *See—*
Stammann, Gunter; Kricsfalussy, Zoltan; Waldmann, Helmut; Schneider, Joachim; and Medem, Harald, 4,714,689, Cl. 502-54.000.

Schneider, Walter: *See—*
Boden, Heinrich; and Schneider, Walter, 4,714,579, Cl. 264-328.600.

Schornick, Gunnar; Elzer, Albert; and Hofmann, Reiner, to BASF Aktiengesellschaft. Crosslinkable resin, photosensitive recording material based on this crosslinkable resin, and production of a lithographic printing plate using this photosensitive recording material. 4,714,751, Cl. 528-103.000.

Schowiak, Duane C.: *See—*
Otterstetter, Charles H.; Schowiak, Duane C.; and Stueckle, Paul, 4,714,179, Cl. 222-148.000.

Schrader, Bernhard. Sample arrangement for spectrometry, method for the measurement of luminescence and scattering and application of the sample arrangement. 4,714,345, Cl. 356-246.000.

Schreurs, Emile; Joader, Stefan; and Valdemarsson, Stefan, to Asea Aktiebolag. Current limiter. 4,714,974, Cl. 361-12.000.

Schrodl, Hermann, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Impact bar for a comminuting rotor. 4,714,207, Cl. 241-189.00R.

Schroeder, Wolfgang: *See—*
Hofmeier, Gerhard; Petersen, Karl; and Schroeder, Wolfgang, 4,714,527, Cl. 204-1.00T.

Schubert, Peter J., to General Motors Corporation. Method of fabricating self-aligned silicon-on-insulator like devices. 4,714,685, Cl. 437-41.000.

Schuetz, Jeffrey M.: *See—*
Lustig, Stanley; Schuetz, Jeffrey M.; and Vicik, Stephen J., 4,714,638, Cl. 428-35.000.

Schulte, Frank. Barge coupler assembly. 4,714,042, Cl. 114-77.00R.

Schwab, Frederick C.: *See—*
Kadash, Marjory A.; and Schwab, Frederick C., 4,714,658, Cl. 428-523.000.

Schwan-Stabilo Schwanhausser GmbH & Co.: *See—*
von Kleinsorgen, Reinhard, 4,714,085, Cl. 132-88.700.

Schwartz, Abraham, to Flow Cytometry Standards Corporation. Fluorescent calibration microbeads simulating stained cells. 4,714,682, Cl. 436-10.000.

Schwartz, Frederic W., to Cable Electric Products, Inc. Telephone wire-and-jack attachment device and kit. 4,713,874, Cl. 29-566.400.

Schweitzer, Edmund O., Jr. Voltage loss detector. 4,714,916, Cl. 340-664.000.

Schwingenschuh, Martin; Meschan, Franz; and Ribitsch, Gert, to Siemens Aktiengesellschaft. Electrical component having high strength given stressing due to temperature change and due to surge currents, particularly a varistor. 4,714,910, Cl. 338-21.000.

Science Applications International Corporation: *See—*
True, Charles W., III; and Brady, John K., 4,715,046, Cl. 375-61.000.

Scientific Drilling International: *See—*
Yeo, David E., 4,715,022, Cl. 367-83.000.

Scott, Leslie D., to Trusco Tank Inc. Large storage tank structures. 4,714,170, Cl. 220-5.00A.

Scott, Ray V., Jr.: *See—*
House, David W.; and Scott, Ray V., Jr., 4,714,512, Cl. 156-306.600.

Searing, Lawrence G.: *See—*
Counter, Louis F.; Born, Richard C.; Walters, LeRoy M.; Ziese, Lowell B.; and Searing, Lawrence G., 4,714,917, Cl. 340-679.000.

Searle, Robin H. J., to Normalair-Garrett (Holdings) Limited. Fluid pressure intensifier device. 4,714,411, Cl. 417-246.000.

Seidel, Karl R., Jr.: *See—*
Kantrud, Steven G.; Ericson, Steven V.; and Seidel, Karl R., Jr., 4,714,150, Cl. 198-463.300.

Seiko Epson Corporation: *See—*
Minowa, Masahiro, 4,714,363, Cl. 400-322.000.

Seiko Seiki Kabushiki Kaisha: *See—*
Oshima, Jinichiro, 4,713,914, Cl. 51-281.00P.

Seitetsu Kagaku Co., Ltd.: *See—*
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, 4,714,791, Cl. 568-913.000.

Seko, Shoichi: *See—*
Hattori, Tetsuo; and Seko, Shoichi, 4,714,132, Cl. 180-312.000.

Selak, Martin. Sheet feeding apparatus. 4,714,242, Cl. 271-100.000.

Seltzman, Herbert H.; and Hsieh, Yung-Ao, to Research Triangle Institute. Aminomalonyl alanine compounds as dietary sweeteners. 4,714,619, Cl. 426-548.000.

Senderowicz, Daniel: *See—*
Nicollini, Germano; and Senderowicz, Daniel, 4,714,895, Cl. 330-258.000.

Senger, Robert D.; Pirl, William E.; and Roth, Charles H., Jr., to Westinghouse Electric Corp. Tool and method for rotopeening the peripheral tubes in a tubesheet. 4,713,952, Cl. 72-53.000.

Senkan, Selim M., to Illinois Institute of Technology. Production of higher molecular weight hydrocarbons from methane. 4,714,796, Cl. 585-328.000.

Sensabaugh, Andrew J., Jr.: *See—*
Banerjee, Chandra K.; Farrier, Ernest G.; Reynolds, John H., IV; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Shannon, Michael D.; and Shelar, Gary R., 4,714,082, Cl. 131-359.000.

Serini, Volker; Freitag, Dieter; and Rathmann, Dietrich, to Bayer Aktiengesellschaft. Process for the preparation of aromatic polyestercarbonates having improved notched impact strength, and polyestercarbonates prepared thereby and their use for the production of mouldings, films and coatings. 4,714,746, Cl. 525-439.000.

Serizawa, Takashi: *See—*
Usui, Masayuki; Imataki, Hiroyuki; Serizawa, Takashi; Baba, Takeshi; and Nose, Hiroyasu, 4,714,326, Cl. 350-485.000.

Service, Robert S. Spice rack. 4,714,305, Cl. 312-306.000.

Seto, Yoshiko: *See—*
Fukushima, Koji; Seto, Yoshiko; Kawada, Kazuhiro; Toi, Koji; and Kumashiro, Izumi, 4,714,713, Cl. 514-563.000.

Sezeur, Alain J. P. R.: *See—*
Rey, Pierre; Abbou, Clement; Leandri, Jacqueline; and Sezeur, Alain J. P. R., 4,714,074, Cl. 128-1.100.

SGS Microelettronica S.p.A.: *See—*
Botti, Edoardo; and Stefani, Fabrizio, 4,714,898, Cl. 330-298.000.

SGS Microelettronica SpA: *See—*
Devecchi, Daniele; and Torelli, Guido, 4,714,845, Cl. 307-496.000.
Murari, Bruno; Pasetti, Mauro; and Rossetti, Nazzareno, 4,714,897, Cl. 330-288.000.
Nicollini, Germano; and Senderowicz, Daniel, 4,714,895, Cl. 330-258.000.

Shafritz, David A.: *See—*
Shouval, Daniel; Shafritz, David A.; and Wands, Jack R., 4,714,613, Cl. 424-86.000.

Shah, Divyesh P.: *See—*
Malladi, Devi P.; Mathew, Ranjan; and Shah, Divyesh P., 4,714,517, Cl. 156-629.000.

Shannon, Michael D.: *See—*
Banerjee, Chandra K.; Farrier, Ernest G.; Reynolds, John H., IV; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Shannon, Michael D.; and Shelar, Gary R., 4,714,082, Cl. 131-359.000.

Shapiro, Neil R.: *See*—
Koch, Steven R.; Stein, Charles R.; Hatfield, William T.; Shapiro, Neil R.; and Hughes, William C., 4,715,030, Cl. 370-85.000.

Sharp Corporation: *See*—
Kishida, Yoshifumi; and Takeuchi, Masayoshi, 4,714,086, Cl. 134-83.000.

Sharp, Daryl. Method and device for vacuum chromatography. 4,713,963, Cl. 73-23.100.

Sharp Kabushiki Kaisha: *See*—
Fujiwara, Katsuyoshi; and Anzai, Shunju, 4,714,945, Cl. 355-69.000.
Higashigaki, Yoshiyuki; Yoshimoto, Yoshikazu; Suzuki, Tomonari; Nakajima, Shigeo; and Inoguchi, Toshio, 4,714,639, Cl. 428-36.000.
Inoue, Tomohiro; Tsugei, Shinji; and Iguchi, Shigeki, 4,715,010, Cl. 364-705.000.
Maruyama, Toshio; Shibuya, Noriaki; and Nakata, Yukihiko, 4,714,868, Cl. 320-5.000.
Mimoto, Toshio; and Ota, Yoshiji, 4,715,015, Cl. 365-210.000.
Yamagishi, Toshio; and Fujiwara, Katsuyoshi, 4,714,941, Cl. 355-8.000.
Yoshiura, Syoichiro, 4,714,944, Cl. 355-55.000.

Sharpe, John W.: *See*—
Malson, William S.; and Sharpe, John W., 4,714,550, Cl. 210-244.000.

Shaw, Benjamin G.: *See*—
Bente, H. Bryan; Herman, Alan C.; Myerson, Joel; Shaw, Benjamin G.; and Stefanski, Andrew, 4,714,545, Cl. 210-101.000.

Shaw, Wilfrid G.: *See*—
Paparizos, Christos; Shaw, Wilfrid G.; and Callahan, James L., 4,714,695, Cl. 502-339.000.

Sheffield, Richard L.: *See*—
Fraser, John S.; and Sheffield, Richard L., 4,715,038, Cl. 372-2.000.

Shelar, Gary R.: *See*—
Banerjee, Chandra K.; Farrier, Ernest G.; Reynolds, John H., IV; Ridings, Henry T.; Sensabaugh, Andrew J., Jr.; Shannon, Michael D.; and Shelar, Gary R., 4,714,082, Cl. 131-359.000.

Shell Oil Company: *See*—
Wansiak, Derk H. N., 4,714,480, Cl. 55-43.000.

Shell Western E&P Inc.: *See*—
Gilchrist, Robert T., Jr., 4,714,379, Cl. 405-163.000.

Shelton, Ronnie J. Guard for protecting a compound box. 4,714,070, Cl. 124-86.000.

Shepherd, Robert W., to Ellcon-National, Inc. Railway car hand brake with release governor. 4,714,142, Cl. 188-185.000.

Sheppard, William L. Powered V-berth platform. 4,714,043, Cl. 114-343.000.

Shibata, Tohru; and Okamoto, Ichiro, to Daicel Chemical Industries, Ltd. Agent for separation. 4,714,555, Cl. 210-635.000.

Shibuya America Corporation: *See*—
Hoffmann, Wolfgang W., 4,714,515, Cl. 156-450.000.

Shibuya, Noriaki: *See*—
Maruyama, Toshio; Shibuya, Noriaki; and Nakata, Yukihiko, 4,714,868, Cl. 320-5.000.

Shigeyuki, Akita, to Nippon Soken, Inc. Photo-electric conversion device with dark current compensation. 4,714,827, Cl. 250-214.00C.

Shih, Kun M.: *See*—
Brundidge, Steven P.; Brodfuehrer, Paul R.; Sapino, Chet, Jr.; Shih, Kun M.; and Walker, Donald G., 4,714,760, Cl. 540-222.000.

Shimada, Masami, to Brother Kogyo Kabushiki Kaisha. Sewing machine driving system. 4,714,039, Cl. 112-275.000.

Shimagaki, Makoto: *See*—
Zanma, Jun; Nishimura, Yoshinori; Shyoji, Kazuo; Shimagaki, Makoto; and Nakajima, Yoichi, 4,714,592, Cl. 422-192.000.

Shimomura, Hiroshi; Iizuka, Kazuo; Harano, Makoto; and Hamada, Akifumi, to Mitsubishi Kinzoku Kabushiki Kaisha; and Ryoco Seiki Co., Ltd. Insert rotary cutter. 4,714,383, Cl. 407-42.000.

Shin-Etsu Chemical Co., Ltd.: *See*—
Itoh, Kunio; Fukuda, Takeshi; and Yoshioka, Hiroshi, 4,714,733, Cl. 524-493.000.

Shinada, Haruji: *See*—
Kawajiri, Kazuhiro; Tamura, Hiroshi; Shinada, Haruji; Saito, Mitsuo; and Mizobuchi, Yuzo, 4,714,950, Cl. 357-30.000.

Shinko Seito Co., Ltd.: *See*—
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, 4,714,791, Cl. 568-913.000.

Shinko Sugar Production Co., Ltd.: *See*—
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, 4,714,791, Cl. 568-913.000.

Shinozaki, Takashi; and Kawaguchi, Takeshi, to Honda Giken Kogyo Kabushiki Kaisha. Four-wheel drive vehicle. 4,714,126, Cl. 180-233.000.

Shipp, Peter W., Jr.; and Vogt, Clifford M., to Kimberly-Clark Corporation. Melt-blown material with depth fiber size gradient. 4,714,647, Cl. 428-212.000.

Shiraishi, Daiichi: *See*—
Kinaga, Eiichi; and Shiraishi, Daiichi, 4,713,862, Cl. 16-223.000.

Shiraishi, Ikuya: *See*—
Mochizuki, Takeshi; Iwasawa, Katsumasa; Shiraishi, Ikuya; and Terafuji, Kazuki, 4,714,635, Cl. 427-421.000.

Shlain, Vladimir: *See*—
Palmin, Simyon; and Shlain, Vladimir, 4,714,867, Cl. 318-696.000.

Shoji, Norio; and Takeda, Masashi, to Sony Corporation. Double-sided logic input differential switch. 4,714,841, Cl. 307-455.000.

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Shubaly, Murray R., to Atomic Energy of Canada, Limited. Method and apparatus for generating ion beams. 4,714,834, Cl. 250-427.000.

Shulof, George F.; and DiMonte, Michael J., to Combustion Engineering, Inc. Pulverized solid control system. 4,714,202, Cl. 241-30.000.

Shyoji, Kazuo: *See*—
Zanma, Jun; Nishimura, Yoshinori; Shyoji, Kazuo; Shimagaki, Makoto; and Nakajima, Yoichi, 4,714,592, Cl. 422-192.000.

Sidebotham, Christopher G.: *See*—
Averill, Robert G.; Khowaylo, Alex; and Sidebotham, Christopher G., 4,714,472, Cl. 623-20.000.

Siebels, Wolfgang: *See*—
Lechner, Fritz; Heissler, Herbert; Scheer, Wolfgang; Siebels, Wolfgang; and Ascherl, Rudolf, 4,714,467, Cl. 623-16.000.

Siecor Corporation: *See*—
Szentesi, Otto I., 4,714,317, Cl. 350-96.210.

Siegel, Harald; and Hauptmann, Rudolf, to Siemens Aktiengesellschaft. Pulse doppler radar with variable pulse repetition rate. 4,714,927, Cl. 342-160.000.

Siegel, Sanford A.; and Noding, Stephen A., to Dow Chemical Company, The. Secondary battery. 4,714,665, Cl. 429-192.000.

Siegert, Friedrich: *See*—
Ranke, Gerhard; and Siegert, Friedrich, 4,713,940, Cl. 62-17.000.

Sielaff, Ulrich; and Hamel, David O., to United Steel Products Company. Method and means for building a pitched roof building using only square-end framing members. 4,713,923, Cl. 52-713.000.

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Auracher, Franz, 4,714,311, Cl. 350-96.110.
Bachel, Ernst; and Giebel, Wolfgang, 4,714,277, Cl. 285-39.000.
Biermeier, Johann; and Brand, Wilhelm, 4,714,972, Cl. 360-97.000.
Boehner, Michael, 4,715,035, Cl. 371-23.000.
Eberspaecher, Joerg, 4,715,026, Cl. 370-1.000.
Goldmann, Horst; Einsle, Guenter; Brugger, Rudolf; and Wacker, Josef, 4,713,866, Cl. 29-33.00K.
Hahn, Alfred; Kamm, Bodo; Weiss, Karl; and Dummert, Johannes, 4,715,057, Cl. 378-197.000.
Hedberg, Sven-Erik; Lekholm, Anders; and Lindgren, Anders, 4,714,079, Cl. 128-419.0PG.
Kiesel, Helmut; and Stoeckl, Klaus, 4,714,222, Cl. 248-282.000.
Krause, Bernd, 4,714,879, Cl. 324-158.00F.
Krause, Dieter, 4,714,315, Cl. 350-96.200.
Lechner, Robert; Rudolf, Hans-Werner; and Krimmer, Roland, 4,715,058, Cl. 379-27.000.
Meissner, Ralph; and Popp, Walter, 4,714,887, Cl. 324-322.000.
Rose, Harald; Zach, Joachim; and Lischke, Burkhard, 4,714,833, Cl. 250-397.000.
Schwingenschuh, Martin; Meschan, Franz; and Ribitsch, Gert, 4,714,910, Cl. 338-21.000.
Siegel, Harald; and Hauptmann, Rudolf, 4,714,927, Cl. 342-160.000.
Steinigeweg, Rolf-Jurgen, 4,714,878, Cl. 324-158.0MG.
Wohlgemuth, Juergen, 4,713,962, Cl. 73-11.000.

Sieron, Richard L.: *See*—
Fernandes, Roosevelt A.; Smith-Vaniz, William R.; Burbank, John E., III; and Sieron, Richard L., 4,714,893, Cl. 324-126.000.

Sigiki, Hiraku; Yamada, Makoto; and Miyamori, Shinji, to Sony Corporation. Method and apparatus for reproducing signals having improved rotary head tracking control. 4,714,971, Cl. 360-77.000.

Silberberg, Joseph: *See*—
Jung, Alfred K.; Silberberg, Joseph; and Weil, Edward D., 4,714,724, Cl. 524-100.000.

Siler, G. Daniel, to Dayton Machine Tool Company. Dual pinion anti-backlash carriage drive for a machine tool. 4,714,388, Cl. 409-146.000.

Sillitto: Hillary G., to Ferranti Plc. Optical viewing apparatus. 4,714,321, Cl. 350-174.000.

Silverthorn, Gideon C., to Canada, Her Majesty the Queen in right of. Automated production of canisters. 4,714,486, Cl. 55-316.000.

Simmons, Arturo; Walsh, Shawn T.; and Roberts, Charles G., to Texas Instruments Incorporated. Electrostatic discharge protection using thin nickel fuse. 4,714,949, Cl. 357-23.130.

Simon, James R.: *See*—
Kelly, George G.; McLaughlin, Henry; and Simon, James R., 4,714,017, Cl. 102-275.300.

Simpson, George E.: *See*—
Webb, John D., Jr.; Hori, Roy Y.; and Simpson, George E., 4,714,470, Cl. 623-18.000.

Simpson Strong-Tie Company, Inc.: *See*—
Commins, Alfred D., 4,714,372, Cl. 403-400.000.

Singer Company, The: *See*—
Johnson, Ralph E.; and Rodda, Donald, 4,714,037, Cl. 112-184.000.

Sirkis, Murray D., to Arizona Board of Regents. Means and methods for heating semiconductor ribbons and wafers with microwvaes. 4,714,810, Cl. 219-10.55M.

Sisk, George W.; Lynn, Shelby A.; Keil, John P.; and Woods, John T., to Whirlpool Corporation. Built-in refrigerator cabinet. 4,714,304, Cl. 312-214.000.

Skaggs, John E., Jr. Method and apparatus for augmentation of sound by enhanced resonance. 4,714,133, Cl. 181-160.000.
Skega Aktiebolag: *See*—
Svensson, Assar; and Granlund, Dan, 4,714,302, Cl. 305-35.0EB.
SKF GmbH: *See*—
Winter, Heinrich; and Kufner, Walter, 4,714,359, Cl. 384-571.000.
Skinner, Jerald P.; Zlotky, Richard A.; and Diel, Robert L. Foundation system for ground-mounted masts. 4,714,225, Cl. 248-523.000.
Skis Rossignol S.A.: *See*—
Abondance, Roger; Corbet, Pierre; Jodelet, Francois; and Andre, Jean-Francois, 4,714,267, Cl. 280-615.000.
Skowronski, Michael J.: *See*—
Londrigan, Michael E.; and Skowronski, Michael J., 4,714,717, Cl. 521-131.000.
Slaker, Frank A.: *See*—
Archibald, G. Kent; and Slaker, Frank A., 4,714,463, Cl. 604-81.000.
Slicer, Allan E.: *See*—
McGoldrick, Gilbert A.; and Slicer, Allan E., 4,714,431, Cl. 439-212.000.
Slob, Arie: *See*—
Hart, Cornelis M.; and Slob, Arie, 4,714,842, Cl. 307-477.000.
Smart, W. James, to CM & E/California, Inc. Industrial exhaust ventilation system. 4,714,010, Cl. 98-115.400.
Smayling, Michael C.: *See*—
Tuvell, James A.; and Smayling, Michael C., 4,715,014, Cl. 365-185.000.
Smetanine, Alexandre: *See*—
Sauron, Albert; and Smetanine, Alexandre, 4,714,258, Cl. 277-72.00R.
Smith, Don A., Jr. Portable cleaning container. 4,713,859, Cl. 15-264.000.
Smith, James L.: *See*—
Kaun, Thomas D.; and Smith, James L., 4,714,661, Cl. 429-14.000.
Smith, John W.: *See*—
Hendy, Brian N.; and Smith, John W., 4,714,725, Cl. 524-108.000.
Smith, Leonard S.: *See*—
Haagensen, Duane B.; Moses, Darcy C.; and Smith, Leonard S., 4,714,812, Cl. 219-10.55A.
Smith, Michael D., to Thomson Components-Mostek Corporation. Semiconductor chip power supply monitor circuit arrangement. 4,714,843, Cl. 307-491.000.
Smith, Robert W., to Colony Services Inc. Harvesting of aquatic vegetation by helicopters. 4,713,929, Cl. 56-8.000.
Smith-Vaniz, William R.: *See*—
Fernandes, Roosevelt A.; Smith-Vaniz, William R.; Burbank, John E., III; and Sieron, Richard L., 4,714,893, Cl. 324-126.000.
SmithKline-RIT: *See*—
Delgoffe, Jean-Claude; Lobmann, Michele; and Zygraich, Nathan, 4,714,678, Cl. 435-235.000.
Snyder, Lynn K.: *See*—
Koblitz, Francis F.; and Snyder, Lynn K., 4,714,801, Cl. 174-88.00R.
Societe Anonyme Dite: Laboratoire L. Lafon: *See*—
Lafon, Louis, 4,714,699, Cl. 514-227.000.
S.A. Fonderies du Lion: *See*—
Herve, Michel, 4,714,073, Cl. 126-91.00R.
Societe d'Applications Generales d'Electricite et de Mecanique (SAGEM): *See*—
Lamiaux, Sylves; and Kuhn, Alex, 4,715,016, Cl. 365-229.000.
Societe Nationale d'Etudes et de Construction de Moteurs O'Aviation (S.N.E.C.M.A.): *See*—
Lardellier, Alain M. J., 4,714,404, Cl. 415-127.000.
Societe pour d'Etude et la Fabrication de Circuits Integres Speciaux EFCIS: *See*—
Baudrant, Annie; and Marty, Michel, 4,714,951, Cl. 357-67.000.
Soderstrom, Sigvard: *See*—
Oldfelt, Sven; and Soderstrom, Sigvard, 4,713,847, Cl. 4-316.000.
Soejima, Hidenobu: *See*—
Akiba, Yasuhiro; Namba, Masato; Kikuchi, Seiji; and Soejima, Hidenobu, 4,714,850, Cl. 310-49.00R.
Soemers, Hermanus M. J. R.: *See*—
Koster, Marinus P.; Soemers, Hermanus M. J. R.; and Dona, Marinus J. J., 4,713,977, Cl. 74-191.000.
Sogabe, Masatoyo: *See*—
Kawada, Shigeki; Amemiya, Yoichi; Sogabe, Masatoyo; and Kumagai, Kazushi, 4,714,852, Cl. 310-156.000.
Sokalski, Stanley M., to Detrex Corporation. 2,2-bis (4 hydroxyphenyl) alkyl poly derivatives for use in after-treatment of conversion coated metals. 4,714,752, Cl. 528-153.000.
Solomon, Donald F.; Solomon, Romona L.; and Good, Charlie J., to Newport Filters, Inc. Potable water filter. 4,714,546, Cl. 210-137.000.
Solomon, Jack. Storage rack. 4,714,165, Cl. 211-11.000.
Solomon, Romona L.: *See*—
Solomon, Donald F.; Solomon, Romona L.; and Good, Charlie J., 4,714,546, Cl. 210-137.000.
Solvay & Cie (Societe Anonyme): *See*—
Collin, Andre , 4,714,720, Cl. 521-171.000.
Somma, Jack J.: *See*—
Damour, Philippe; Patoureau, Alain; Somma, Jack J.; and Thompson, Ronald J., 4,714,356, Cl. 384-275.000.
Sony Corporation: *See*—
Shoji, Norio; and Takeda, Masashi, 4,714,841, Cl. 307-455.000.
Sigiki, Hiraku; Yamada, Makoto; and Miyamori, Shinji, 4,714,971, Cl. 360-77.000.
Watanabe, Toshihiro; and Meguro, Hiroshi, 4,714,213, Cl. 242-198.000.
Yoshinaka, Tadaaki; and Inoue, Takao, 4,714,954, Cl. 358-19.000.
Yoshinaka, Tadaaki; Inoue, Takao; and Tomita, Kazuo, 4,714,965, Cl. 358-320.000.
Soref, Richard A.: *See*—
Yang, Andrew C.; Payne, Richard; and Soref, Richard A., 4,714,314, Cl. 350-96.200.
Southwestern Analytical Chemicals, Inc.: *See*—
Hale, Cecil H.; Tanner, Alan R.; and Hale, Bryan M., 4,714,530, Cl. 204-131.000.
Souza, Thomas, Jr. Rail connector. 4,714,369, Cl. 403-190.000.
Spater, Stuart S.: *See*—
Kolton, Chester; and Spater, Stuart S., 4,714,156, Cl. 206-296.000.
Spector, Donald. Night light assembly. 4,714,984, Cl. 362-101.000.
Spector, George: *See*—
Anderson, Mark S.; and Spector, George, 4,713,904, Cl. 42-79.000.
Calloway, Luther, Jr.; and Spector, George, 4,713,900, Cl. 40-324.000.
Collins, William K.; and Spector, George, 4,713,947, Cl. 66-1.00A.
Roper, Peter; and Spector, George, 4,713,909, Cl. 47-17.000.
Spectra-Physics, Inc.: *See*—
Miller, Mike F.; and Gunther, Kim M., 4,715,039, Cl. 372-37.000.
Speidell, James L.: *See*—
Clark, Gregory J.; Chaudhari, Praveen; Cuomo, Jerome J.; Frisch, Margaret A.; and Speidell, James L., 4,714,831, Cl. 250-305.000.
Spence-Bate, Harry A. H., to Spence-Bate, Joyce Florence. Lamina retrieval apparatus. 4,714,240, Cl. 271-3.100.
Spence-Bate, Joyce Florence: *See*—
Spence-Bate, Harry A. H., 4,714,240, Cl. 271-3.100.
Speranza, Donald, to Eaton Corporation. Method for controlling AMT system start from stop operation. 4,714,144, Cl. 192-0.084.
Speranza, George P.: *See*—
Grigsby, Robert A., Jr.; and Speranza, George P., 4,714,750, Cl. 528-99.000.
Sperry Corporation: *See*—
Wilson, Bart A.; Jenkins, Vaughn J.; and Fonnesbeck, Dale D., 4,714,837, Cl. 307-289.000.
Spevack, Jerome S., to Deuterium Corporation. Process for separating high purity water. 4,714,525, Cl. 203-10.000.
Spider Staging, Inc.: *See*—
Tracy, Stephen E., 4,714,226, Cl. 240-544.000.
Spietschka, Ernst: *See*—
Wiedemann, Wolfgang; Spietschka, Ernst; and Troester, Helmut, 4,714,666, Cl. 430-59.000.
Spires, Walter P., Jr.: *See*—
Brooks, John G., Jr.; and Spires, Walter P., Jr., 4,714,474, Cl. 623-20.000.
Spradley, Willie D.; and Creswell, Paul J. Hydraulic jacking system for unseating wedge from rope sockets. 4,714,238, Cl. 254-93.00R.
Spruck, Bernd; and Gerber, Siegfried, deceased (by Gerber, Hannelore, Silvia Gerber, Eberhard Gerber, Bernhard Gerber, legal representatives), to Carl-Zeiss-Stiftung. Attenuator for extraneous light fluctuations in a microscope with automatic brightness control. 4,714,823, Cl. 250-205.000.
Square D Company: *See*—
Dvorak, Robert F., 4,714,975, Cl. 361-44.000.
Hoelzer, John S.; Graefe, Richard J.; and Libert, James T., 4,714,977, Cl. 361-196.000.
McGoldrick, Gilbert A.; and Slicer, Allan E., 4,714,431, Cl. 439-212.000.
SRI International: *See*—
Peppers, Norman A.; and Schaefer, Louis F., 4,714,310, Cl. 350-6.600.
Stabler, Gerhard, to Santrade Ltd. Sealing arrangement for a medium-containing chamber of a dual belt press. 4,714,015, Cl. 100-154.000.
Stacy, Jack C., Jr. Single laterally bendable track snowmobile. 4,714,125, Cl. 180-182.000.
Stadler, Peter: *See*—
Keutgen, Franz; Kubon, Achim; Perings, Dieter; Stadler, Peter; Voss-Spilker, Peter; and Apel, Karl-Hermann, 4,714,105, Cl. 164-420.000.
Staerzl, Richard E., to Brunswick Corporation. Electronic fuel injection circuit with altitude compensation. 4,714,067, Cl. 123-494.000.
Stahlecker, Fritz: *See*—
Zott, Werner, 4,713,932, Cl. 57-406.000.
Stahlecker, Hans: *See*—
Zott, Werner, 4,713,932, Cl. 57-406.000.
Stambaugh, Mark A., to Texas Instruments Incorporated. Frequency divide by N circuit. 4,715,052, Cl. 377-108.000.
Stammann, Gunter; Kricsfalussy, Zoltan; Waldmann, Helmut; Schneider, Joachim; and Medem, Harald, to Bayer Aktiengesellschaft. Process for the regeneration of catalysts for the gas-phase reduction of aromatic nitro compounds. 4,714,689, Cl. 502-54.000.
Standard Oil Company, The: *See*—
Paparizos, Christos; Shaw, Wilfrid G.; and Callahan, James L., 4,714,695, Cl. 502-339.000.
Staniszewski, Tadeusz, to Ziyad Incorporated. Paper tray for a printing device. 4,714,243, Cl. 271-171.000.
Stanley, Laverne: *See*—
Carden, Anthony A., 4,714,609, Cl. 424-59.000.
Stauffer Chemical Company: *See*—
Jung, Alfred K.; Silberberg, Joseph; and Weil, Edward D., 4,714,724, Cl. 524-100.000.
Kogan, Marcelo; Dinizo, Stephen E.; and Fancher, Llewellyn W., 4,714,493, Cl. 71-99.000.

Prisbylla, Michael P., 4,714,491, Cl. 71-86.000.

Steele, Bruce B.; Rushing, Allen J.; and Robinson, Kelly S., to Eastman Kodak Company. Electrographic magnetic brush development apparatus and system. 4,714,046, Cl. 118-657.000.

Steer, Peter L., to Craig Medical Products Ltd. Urostomy appliance. 4,714,465, Cl. 604-340.000.

Stefani, Fabrizio: *See*—
Botti, Edoardo; and Stefani, Fabrizio, 4,714,898, Cl. 330-298.000.

Stefanski, Andrew: *See*—
Bente, H. Bryan; Herman, Alan C.; Myerson, Joel; Shaw, Benjamin G.; and Stefanski, Andrew, 4,714,545, Cl. 210-101.000.

Stein, Charles R., to General Electric Company. Apparatus and method for determining the source direction of local area network transmissions. 4,714,802, Cl. 178-1.000.

Stein, Charles R.: *See*—
Koch, Steven R.; Stein, Charles R.; Hatfield, William T.; Shapiro, Neil R.; and Hughes, William C., 4,715,030, Cl. 370-85.000.

Steiner, Karl-Heinz: *See*—
Bender, Wolfgang; Mrotzek, Dieter; Koglin, Bernd; and Steiner, Karl-Heinz, 4,714,456, Cl. 494-36.000.

Steinigeweg, Rolf-Jurgen, to Siemens Aktiengesellschaft. Apparatus for forming the actual value of a torque in a three-phase synchronous machine with current-block feeding. 4,714,878, Cl. 324-158.0MG.

Steinko, Willi, to Mike & Kremmel Ltd. Devices for crushing, mashing and/or grinding foodstuffs. 4,714,205, Cl. 241-95.000.

Steltenkamp, Robert J.; and Camara, Michael A., to Colgate-Palmolive Company. Antistatic agents which are diamines of trialkylacetic acids and diamines. 4,714,559, Cl. 252-8.800.

Stepczyk, Frank M.: *See*—
Materna, Anthony T.; Vossler, Roger A.; and Stepczyk, Frank M., 4,714,995, Cl. 364-200.000.

Stern, Kurt J. Knockdown furniture. 4,714,027, Cl. 108-111.000.

Sterner, Rudolph J.; and Harris, Steven, to Advanced Micro Devices, Inc. Rate-of-change signal generator using sampling techniques. 4,714,866, Cl. 318-636.000.

Stevens, John: *See*—
Harelstad, Roberta E.; and Stevens, John, 4,714,838, Cl. 307-427.000.

Stevenson, Ernest W.; and Nahas, Randall E., to Levitator, Inc. Seaplane and dock lift. 4,714,375, Cl. 405-3.000.

Stevenson, Hildreth W., to B. F. Goodrich Company, The. Radiant heat resistant stencilible inflatable and method. 4,714,637, Cl. 428-35.000.

Stillwagon, W. C. Method and apparatus for inspecting high speed converted web. 4,714,340, Cl. 356-23.000.

Stipanuk, John M.; and Yun, John M., to Molex Incorporated. Connection for flexible apparatus. 4,714,435, Cl. 439-496.000.

Stockburger, Hans-Dieter. Pocket air velocity gauge. 4,713,972, Cl. 73-861.760.

Stoeckl, Klaus: *See*—
Kiesel, Helmut; and Stoeckl, Klaus, 4,714,222, Cl. 248-282.000.

Stoker, Jeffrey: *See*—
McPherson, Hugh; and Stoker, Jeffrey, 4,714,873, Cl. 324-57.00N.

Stokes, David H.: *See*—
Cooper-Hart, Michael A.; Emmons, Lawrence D.; Mackley, James S.; and Stokes, David H., 4,715,059, Cl. 379-53.000.

Stone, Stanley A., to Varian Associates, Inc./Scientific Systems, Inc. Autosampler. 4,713,974, Cl. 73-864.230.

Stone, Wayne B., Jr., to Wood Manufacturing. Injection molded, self sealing top assembly for open mouth coffee pots. 4,714,180, Cl. 222-456.000.

Stormberg, Hans-Peter: *See*—
Dannert, Horst; Ganser, Hans-Gunther; Schafer, Ralf; and Stormberg, Hans-Peter, 4,714,862, Cl. 315-244.000.

Strack, Hans; and Kleinschmit, Peter, to Degussa Aktiengesellschaft. Silicate-bound zeolite granulates, process for their production and use. 4,714,690, Cl. 502-64.000.

Stratton, Charlotte D.: *See*—
Hoefle, Milton L.; Holmes, Ann; and Stratton, Charlotte D., 4,714,762, Cl. 514-303.000.

Straub, Lee R.: *See*—
Ranawat, Chitranjan S.; Straub, Lee R.; Inglis, Allan E.; and Burstein, Albert H., 4,714,476, Cl. 623-21.000.

Strauss, Bernhard, to Carl-Zeiss-Stiftung, Heidenhime/Brenz. Apparatus for the protection of a movable elongate machine part. 4,713,892, Cl. 33-559.000.

Strommer, Kurt: *See*—
Hoehn, Herbert; and Strommer, Kurt, 4,713,961, Cl. 72-419.000.

Stuckel, Robert W. Ball inflation apparatus. 4,714,098, Cl. 141-85.000.

Studiecentrum voor Kernenergie, S.C.K.: *See*—
Rahier, Andre ; Cornelissen, Rene D. W.; and Bruggeman, Aime , 4,714,533, Cl. 204-262.000.

Studt, William L.: *See*—
Kuhla, Donald E.; Studt, William L.; Campbell, Henry F.; and Yelnosky, John, 4,714,707, Cl. 514-361.000.

Stueckle, Paul: *See*—
Otterstetter, Charles H.; Schowiak, Duane C.; and Stueckle, Paul, 4,714,179, Cl. 222-148.000.

Sucher, Daniel J.: *See*—
Livingston, David L.; Sucher, Daniel J.; and Walk, Bruce M., 4,714,993, Cl. 364-200.000.

Suerbaum, Hermann: *See*—
Muller, Hans; and Suerbaum, Hermann, 4,714,095, Cl. 138-98.000.

Sugahara, Kazuyuki; Nishimura, Tadashi; Kusunoki, Shigeru; and Inoue, Yasuo, to Agency of Industrial Science and Technology. Method of forming single crystal layer on dielectric layer by controlled rapid heating. 4,714,684, Cl. 437-19.000.

Sugaya, Kazuo: *See*—
Ouchi, Yutaka; Sugino, Akio; Sugaya, Kazuo; and Kimizima, Kazuo, 4,714,104, Cl. 164-504.000.

Sugino, Akio: *See*—
Ouchi, Yutaka; Sugino, Akio; Sugaya, Kazuo; and Kimizima, Kazuo, 4,714,104, Cl. 164-504.000.

Sugino, Yasuo: *See*—
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.

Sugiura, Kazuo: *See*—
Hashimoto, Takatsugu; Maehara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, 4,714,734, Cl. 524-496.000.

Sulentic, Donald N.: *See*—
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Sulzer-Escher Wyss GmbH: *See*—
Holik, Herbert, 4,714,522, Cl. 162-264.000.

Sumitomo Chemical Company, Limited: *See*—
Kisida, Hirosi; Nishida, Sumio; and Hatakoshi, Makoto, 4,714,706, Cl. 514-345.000.
Matsuo, Noritada; Tsushima, Kazunori; Nishida, Sumio; and Yano, Toshihiko, 4,714,712, Cl. 514-531.000.
Minai, Masayoshi; and Ueda, Yuji, 4,714,782, Cl. 568-347.000.

Sumitomo Electric Industries, Ltd.: *See*—
Hayashi, Kyozo; and Noda, Shigeru, 4,714,318, Cl. 350-96.210.
Ide, Takashi, 4,714,343, Cl. 356-73.100.
Takata, Koji; and Nishiyama, Yukinori, 4,714,299, Cl. 303-100.000.

Sumitomo Metal Industries, Ltd.: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yasutaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.

Sumitomo Rubber Industries, Ltd.: *See*—
Nakahara, Akihiro; and Matsuki, Taketo, 4,714,253, Cl. 273-228.000.

Sumiya, Koji: *See*—
Moroto, Shuzo; Sumiya, Koji; Watanabe, Kazuaki; Kubo, Seitoku; Kobayashi, Koji; and Taga, Yutaka, 4,714,146, Cl. 192-85.0AA.

Sun Hydraulics, Inc.: *See*—
Watson, John H., 4,714,293, Cl. 299-12.000.

Sundheimer, Patrick, to Framtome & Cie. Water and steam separating device for drying moist steam. 4,714,055, Cl. 122-488.000.

Sundstrand Corporation: *See*—
Buford, John T., 4,714,051, Cl. 122-21.000.
Fluegel, Theodore D.; and Ryan, Daniel M., 4,713,982, Cl. 74-686.000.
Schaefer, John G.; Aarestad, Jerome K.; and Whitesel, Terry L., 4,714,405, Cl. 415-169.00R.

Sussman, Arthur: *See*—
Roth, Philip M.; Itskovitch, Nathan M.; and Susaman, Arthur, 4,713,894, Cl. 34-30.000.

Susukida, Hiroshi: *See*—
Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yasutaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, 4,714,501, Cl. 148-13.000.

Suzuki, Akira, to Copal Company Limited. Focal plane shutter for cameras. 4,714,336, Cl. 354-246.000.

Suzuki, Akira, to Toshiba Machine Co., Ltd. Laser picture-drawing apparatus. 4,714,933, Cl. 346-108.000.

Suzuki, Keiichiro: *See*—
Sawada, Kouji; Miura, Kiyokatsu; Suzuki, Keiichiro; Idosako, Hidetaka; and Kazusa, Hideo, 4,714,368, Cl. 403-132.000.

Suzuki, Ko: *See*—
Yamashiro, Hiroshi; and Suzuki, Ko, 4,714,506, Cl. 156-80.000.

Suzuki, Narumi; and Takagi, Hisamitsu, to Fujitsu Limited. Housing and securing structure for radio communication device. 4,714,303, Cl. 312-7.100.

Suzuki, Tomonari: *See*—
Higashigaki, Yoshiyuki; Yoshimoto, Yoshikazu; Suzuki, Tomonari; Nakajima, Shigeo; and Inoguchi, Toshio, 4,714,639, Cl. 428-36.000.

Suzuki, Toshio: *See*—
Ohkuma, Kuniaki; Nakagawa, Reiji; Miyao, Hisao; Yoshimura, Shinichi; Suzuki, Toshio; Hayashi, Toyoaki; Arakawa, Masayasu; and Koizumi, Hideharu, 4,714,397, Cl. 414-222.000.

Svensson, Ake P.: *See*—
Wallin, Per Olov T.; Warell, Bengt H.; Svensson, Ake P.; Lundstrom, Kurt A.; and Johansson, Lars A., 4,714,025, Cl. 108-20.000.

Svensson, Assar; and Granlund, Dan, to Skega Aktiebolag. Vehicle track. 4,714,302, Cl. 305-35.0EB.

Swaminathan, Balaji: *See*—
Sander, Craig S.; and Swaminathan, Balaji, 4,714,686, Cl. 437-195.000.

Swan, Leo, to Equipment Development Company, Inc. Drum and cutter assembly for a planing machine. 4,714,294, Cl. 299-39.000.

Swarr, Thomas E.; and Wnuck, Wayne G., to United States of America, Energy. Method of preparing a dimensionally stable electrode for use in a MCFC. 4,714,586, Cl. 419-2.000.

Swarts, Richard E.; Moffatt, E. Marston; and Lopiccolo, Mario T., to United Technologies Corporation. Dual laser beam brazing of fine wires. 4,714,815, Cl. 219-121.0LC.

Swartz, Louis D.: *See*—
Kitamura, Koichi; Swartz, Louis D.; Catchpole, Clive; and Yaniv, Zvi, 4,714,836, Cl. 250-578.000.

Sweers, Ronald L. Edge clip for an eaves trough mounting adapter. 4,713,915, Cl. 52-11.000.

Synthes: *See*—
Comte, Pierre-Andre; Burri, Caius; Claes, Lutz; Gerngross, Heinz; and Meier, Remy, 4,714,076, Cl. 128-92.0ZW.

Szalvay, Laszlo, to Raychem Corporation. Pipe repair sleeve apparatus and method of repairing a damaged pipe. 4,713,870, Cl. 29-402.090.

Szentesi, Otto I., to Siecor Corporation. Biconic optical fiber connector/attenuator. 4,714,317, Cl. 350-96.210.

Szewczyk, Andrew F.: *See*—
Prasad, Chandrika; and Szewczyk, Andrew F., 4,714,982, Cl. 361-404.000.

Szodfridt, Imre; and Knoblauch, Richard, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Double clutch for a motor vehicle transmission. 4,714,147, Cl. 192-87.150.

Szudy, James E.: *See*—
Koening, James P.; Knight, David J.; Szudy, James E.; Bartholomew, Roy E.; and Wurst, William R., 4,714,483, Cl. 55-163.000.

Szuminski, Gary F.; and Nightingale, Douglas J., to Rolls-Royce Inc. Vectorable nozzles for aircraft. 4,713,935, Cl. 60-229.000.

Tabor, Elhanan, to AR-KAL Plastics Products Beit Zera (1973). In-line fluid filtering devices and disc-filters useful in such devices. 4,714,552, Cl. 210-329.000.

Taga, Yutaka: *See*—
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,713,988, Cl. 74-868.000.
Moroto, Shuzo; Sumiya, Koji; Watanabe, Kazuaki; Kubo, Seitoku; Kobayashi, Koji; and Taga, Yutaka, 4,714,146, Cl. 192-85.0AA.

Taiho Pharmaceutical Company, Limited: *See*—
Ogawa, Kazuo; and Honna, Takaji, 4,714,765, Cl. 548-183.000.

Taisei Road Construction Co., Ltd.: *See*—
Mihara, Tohru, 4,714,374, Cl. 404-91.000.

Tajima, Ryohei: *See*—
Nagamoto, Itsushi; Nakanishi, Tatsuo; and Tajima, Ryohei, 4,714,577, Cl. 264-46.600.

Takada, Hiromi, to Ricoh Company, Ltd. Automatically returned paper ball assembly of a printer. 4,714,364, Cl. 400-639.100.

Takagi, Hisamitsu: *See*—
Suzuki, Narumi; and Takagi, Hisamitsu, 4,714,303, Cl. 312-7.100.

Takagi, Makoto: *See*—
Araki, Masatada; Kuroyama, Yutaka; Takeuchi, Yukihisa; Takagi, Makoto; and Imura, Toru, 4,713,871, Cl. 29-421.00E.

Takagi, Masayoshi; Hoshino, Yukio; and Yamauchi, Hiroki, to Toyoda Koki Kabushiki Kaisha. Machine tool with gang head interchange device. 4,713,876, Cl. 29-568.000.

Takagi, Tsuneharu: *See*—
Matsubara, Katsumi; Uchida, Riichi; Muramatsu, Masatoshi; Naya, Kotaro; and Takagi, Tsuneharu, 4,714,418, Cl. 418-201.000.

Takahashi, Mitsuru: *See*—
Tsuruoka, Ichiro; and Takahashi, Mitsuru, 4,714,427, Cl. 432-59.000.

Takahashi, Naoyuki, to Olympus Optical Co., Ltd. Operating microscope apparatus. 4,714,328, Cl. 350-521.000.

Takahashi, Seiichi: *See*—
Ujita, Tsugunobu; and Takahashi, Seiichi, 4,714,130, Cl. 180-262.000.

Takahashi, Shoji: *See*—
Kinugasa, Toshiyuki; Furuya, Tamio; Ishige, Yoshiki; Tsuchimoto, Yuichi; and Takahashi, Shoji, 4,714,424, Cl. 425-388.000.

Takahashi, Sumio: *See*—
Watabe, Seiji; Yokoyama, Isao; Sasaki, Masanori; Toyoshima, Yotaro; Takahashi, Sumio; and Maeda, Tsutomu, 4,714,908, Cl. 335-212.000.

Takahashi, Takeshi: *See*—
Takahashi, Yasuyuki; Aizawa, Shigeru; Tamai, Shigeru; Yoshida, Toshiro; and Takahashi, Takeshi, 4,714,566, Cl. 252-314.000.

Takahashi, Yasuyuki; Aizawa, Shigeru; Tamai, Shigeru; Yoshida, Toshiro; and Takahashi, Takeshi, to Meiji Milk Products Company Limited. Process for producing W/O/W type multiple emusion. 4,714,566, Cl. 252-314.000.

Takano, Hiroji, to Matsushita Electric Industrial Co., Ltd. Apparatus and method for making a stamp. 4,714,957, Cl. 358-93.000.

Takata, Koji; and Nishiyama, Yukinori, to Sumitomo Electric Industries, Limited. Brake pressure control system. 4,714,299, Cl. 303-100.000.

Takats, Gilbert: *See*—
Bacou, Claude; Baptiste, Rene; Feissel, Henri; Takats, Gilbert; and Cabrol, Christian, 4,714,828, Cl. 250-214.00C.

Takayanagi, Shinji, to Honda Giken Kogyo Kabushiki Kaisha. Drive chain adjustment mechanism for vehicles having two rear wheels. 4,714,453, Cl. 474-112.000.

Takeda Chemical Industries, Ltd.: *See*—
Nohara, Akira; and Maki, Yoshitaka, 4,714,774, Cl. 560-053.000.
Yasaburgo, Akagi; Yasumoto, Miura; and Tetsuo, Hoshino, 4,714,611, Cl. 424-85.000.

Takeda, Masashi: *See*—
Shoji, Norio; and Takeda, Masashi, 4,714,841, Cl. 307-455.000.

Takeda, Nobuhiko: *See*—
Hattori, Takemi; and Takeda, Nobuhiko, 4,714,291, Cl. 297-284.000.

Takei, Toshihiro: *See*—
Imoto, Yuzo; Wakata, Hideo; Takei, Toshihiro; and Hattori, Yoshiyuki, 4,714,296, Cl. 303-6.00C.

Takekawa, Kouichi; and Bonkohara, Manabu, to NEC Corporation. Capacitor built-in integrated circuit packaged unit and process of fabrication thereof. 4,714,952, Cl. 357-75.000.

Takemoto, Eiji: *See*—
Nagase, Masaomi; Takemoto, Eiji; Ibuki, Noritaka; and Hasegawa, Takashi, 4,714,068, Cl. 123-506.000.

Takenaka, Shigeo; Kamohara, Eiji; and Nishimura, Takashi, to Kabushiki Kaisha Toshiba. Color cathode ray tube with plural electron gun assemblies. 4,714,856, Cl. 313-2.100.

Takeo, Tadashi: *See*—
Kikuchi, Uhee; and Takeo, Tadashi, 4,714,044, Cl. 118-314.000.

Takeuchi, Hajime: *See*—
Ito, Takeo; Takeuchi, Hajime; Hashimoto, Minoru; and Maeda, Tatsumi, 4,714,654, Cl. 428-328.000.

Takeuchi, Makoto; Kitazumi, Etsuo; Sakaki, Hirokazu; and Okishi, Yoshio, to Fuji Photo Film Co., Ltd. Process for producing aluminum support for lithographic printing plate. 4,714,528, Cl. 204-33.000.

Takeuchi, Masayoshi: *See*—
Kishida, Yoshifumi; and Takeuchi, Masayoshi, 4,714,086, Cl. 134-83.000.

Takeuchi, Yukihisa: *See*—
Araki, Masatada; Kuroyama, Yutaka; Takeuchi, Yukihisa; Takagi, Makoto; and Imura, Toru, 4,713,871, Cl. 29-421.00E.

Tamai, Shigeru: *See*—
Takahashi, Yasuyuki; Aizawa, Shigeru; Tamai, Shigeru; Yoshida, Toshiro; and Takahashi, Takeshi, 4,714,566, Cl. 252-314.000.

Tamamura, Hideo; and Maeno, Hiroshi, to Canon Kabushiki Kaisha. Water-proof window structure of water-proof camera. 4,714,333, Cl. 354-64.000.

Tamayama, Yasuko: *See*—
Rokugawa, Kyuji; and Tamayama, Yasuko, 4,714,672, Cl. 435-7.000.

Tamburrino, Kenneth D.: *See*—
Polick, Raymond L.; Tamburrino, Kenneth D.; and Becker, Edmund H., 4,714,103, Cl. 164-486.000.

Tamura, Hiroshi: *See*—
Kawajiri, Kazuhiro; Tamura, Hiroshi; Shinada, Haruji; Saito, Mitsuo; and Mizobuchi, Yuzo, 4,714,950, Cl. 357-30.000.

Tamura, Takahiro: *See*—
Mizuno, Takao; Uchikawa, Naoshi; Murayama, Akira; Tamura, Takahiro; and Kuroshima, Ryoichi, 4,714,415, Cl. 418-14.000.

Tanabe Seiyaku Co., Ltd.: *See*—
Inoue, Ichizo; Oine, Toyonari; Yamada, Yoshihisa; Ishida, Ryuichi; and Ochiai, Takashi, 4,714,702, Cl. 514-259.000.

Tanaka, Kiyoshi; Saeki, Masaru; Matsuishi, Tsutomu; Koga, Yoshihiro; and Kawakita, Tetsuya, to Ajinomoto Co., Inc. Process for the separation of a basic amino acid from a fermentation broth using cation exchange resins. 4,714,767, Cl. 548-344.000.

Tanaka, Koichi; and Itoh, Satoshi, to Kabushiki Kaisha Toshiba. Digital phase-locked loop circuit. 4,715,050, Cl. 375-111.000.

Taniguchi, Yasushi: *See*—
Sawamura, Mitsuharu; and Taniguchi, Yasushi, 4,714,308, Cl. 350-1.700.

Tanikawa, Isao: *See*—
Maruhashi, Yoshitsugu; Tanikawa, Isao; and Hirata, Sadao, 4,714,580, Cl. 264-516.000.

Tanioka, Hiroshi: *See*—
Inoue, Yutaka; Kurata, Mitsuru; Kasama, Nobuhiro; Hosaka, Masao; Yagasaki, Toshiaki; Tanioka, Hiroshi; and Yamakawa, Tadashi, 4,714,940, Cl. 355-3.00R.

Tanner, Alan R.: *See*—
Hale, Cecil H.; Tanner, Alan R.; and Hale, Bryan M., 4,714,530, Cl. 204-131.000.

Targos, William M., to UOP Inc. Method of making a catalyst composition comprising uniform size metal components on carrier. 4,714,693, Cl. 502-261.000.

Targos, William M.: *See*—
Abrevaya, Hayim; and Targos, William M., 4,714,692, Cl. 502-261.000.

Tassle, C. R. V.; and Freeburg, Thomas A., to Motorola, Inc. Method and apparatus for shedding load in a communications controller of a data communications system. 4,714,923, Cl. 340-825.060.

TDK Corporation: *See*—
Watabe, Seiji; Yokoyama, Isao; Sasaki, Masanori; Toyoshima, Yotaro; Takahashi, Sumio; and Maeda, Tsutomu, 4,714,908, Cl. 335-212.000.

Tecnor: *See*—
Poncelet, Andre ; Getti, Hyacinthe; and Faugouin, Michel, 4,714,626, Cl. 427-49.000.

Teetz, Volker: *See*—
Urbach, Hansjorg; Henning, Rainer; Teetz, Volker; and Becker, Reinhard, 4,714,708, Cl. 514-412.000.

Tektronix, Inc.: *See*—
Addis, John L., 4,714,896, Cl. 330-261.000.
Traa, Einar O., 4,714,872, Cl. 323-314.000.

Telecredit, Inc.: *See*—
Norwich, Daniel, 4,715,061, Cl. 379-91.000.

Telefonaktiebolaget LM Ericsson: *See*—
Nilsson, Olof E., 4,715,032, Cl. 370-86.000.

Telefunken Robetecnica S.R.L.: *See*—
Bosco, Angelo; and Magnaghi, Edgardo, 4,714,212, Cl. 242-182.000.

Telfer, Terrence D. Collapsible cooking unit. 4,714,013, Cl. 99-449.000.

Temet, USA, Inc.: *See*—
Henderson, Dale K., 4,714,282, Cl. 292-36.000.
Templeton, Charles B. Warmed animal toy. 4,714,445, Cl. 446-74.000.
Tenhagen, Rudolf J., to BP Chemicals Limited. Process for making polyurethane foam. 4,714,574, Cl. 264-45.100.
Terafuji, Kazuki: *See*—
Mochizuki, Takeshi; Iwasawa, Katsumasa; Shiraishi, Ikuya; and Terafuji, Kazuki, 4,714,635, Cl. 427-421.000.
Terazono, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Photoelectric transducer with adjustable sensitivity to incident light wavelength. 4,714,824, Cl. 250-211.00R.
Terkelsen, Bruce E., to United Technologies Corporation. Method and apparatus for epitaxial solidification. 4,714,101, Cl. 164-122.200.
Tesmann, Holger: *See*—
von Rybinski, Wolfgang; Tesmann, Holger; and Dobias, Bohuslav, 4,714,544, Cl. 209-167.000.
Tetsuo, Hoshino: *See*—
Yasaburgo, Akagi; Yasumoto, Miura; and Tetsuo, Hoshino, 4,714,611, Cl. 424-85.000.
Texaco Inc.: *See*—
Grigsby, Robert A., Jr.; and Speranza, George P., 4,714,750, Cl. 528-99.000.
Texas Instruments Incorporated: *See*—
Keith, William C., 4,713,939, Cl. 62-6.000.
Simmons, Arturo; Walsh, Shawn T.; and Roberts, Charles G., 4,714,949, Cl. 357-23.130.
Stambaugh, Mark A., 4,715,052, Cl. 377-108.000.
Tuvell, James A.; and Smayling, Michael C., 4,715,014, Cl. 365-185.000.
Textron/Avco Corp.: *See*—
Naik, Subhash K., 4,714,624, Cl. 427-34.000.
Textron Inc.: *See*—
Chaplin, John B.; and Whipple, Charles S., 4,714,443, Cl. 440-89.000.
Thaniyavarn, Suwat, to TRW Inc. Electrostatically biased electrooptical devices. 4,714,312, Cl. 350-96.140.
Thayer, Edward B.; and Ward, Eric J., to United Technologies Corporation. 2-D propulsive lift nozzle. 4,714,197, Cl. 239-265.290.
Thelen, Robert L.: *See*—
Rouse, Michael W.; Thelen, Robert L.; and Morison, John, 4,714,201, Cl. 241-24.000.
Theodoropulos, Spyros, to Viomedics Inc. Novel oxazine-ureas and thiazine urea chromophors as fluorescent labels. 4,714,763, Cl. 544-31.000.
Thevenet, Jean-Claude: *See*—
Gilfaut, Jean-Pierre; Peze, Andre ; Ravillard, Jean-Paul; and Thevenet, Jean-Claude, 4,714,052, Cl. 122-149.000.
Thies, Peter W.; David, Samuel; Kuehl, Ulrich; Buschmann, Gerd; and Flecker, Peter, to Kali-Chemie Pharma GmbH. N-(2,10-dioxa-tricyclo-[5,3,1,$0^{3,8}$]-undecane-5-yl)-tryptamine derivatives and medical compositions thereof. 4,714,709, Cl. 514-414.000.
Thompson, Ronald J.: *See*—
Damour, Philippe; Patoureau, Alain; Somma, Jack J.; and Thompson, Ronald J., 4,714,356, Cl. 384-275.000.
Thomson Components - Mostek Corporation: *See*—
Proebsting, Robert J., 4,714,840, Cl. 307-443.000.
Smith, Michael D., 4,714,843, Cl. 307-491.000.
Thorud, Stanley R., to Liberty Diversified Industries. Security cassette holder. 4,714,161, Cl. 206-387.000.
Thyren, Carl H.; and Hesthamar, Tore, to Enpece AB. Method and apparatus for volume measurement. 4,713,966, Cl. 73-149.000.
TIE/communications, Inc.: *See*—
Korsky, Vincent V.; and Pajer, Raymond T., 4,715,062, Cl. 379-390.000.
Tiede, Edward. Self propelled auger and separable vehicle therefor. 4,714,149, Cl. 198-312.000.
Tietze, Richard C., to Harbor Branch Oceanographic Institution Inc. Remote release tow hooks. 4,714,288, Cl. 294-82.330.
Tisma Machine Corporation: *See*—
Tisma, Steven, 4,713,928, Cl. 53-526.000.
Tisma, Steven, to Tisma Machine Corporation. Automatic packaging machine for closing over filled boxes. 4,713,928, Cl. 53-526.000.
Tobia, Alfonso J.: *See*—
Kanojia, Ramesh M.; Falotico, Robert; Tobia, Alfonso J.; and Press, Jeffery B., 4,714,705, Cl. 514-309.000.
Tocco, Inc.: *See*—
Hammond, Michael R.; and Novorsky, Donald E., 4,714,809, Cl. 219-10.430.
Todaro, George J.: *See*—
Shoyab, Mohammed; Marquardt, Hans; and Todaro, George J., 4,714,683, Cl. 436-547.000.
Toeda, Shigetoshi, to Kyocera Corporation. Sub-combustion chamber of an internal combustion engine. 4,714,062, Cl. 123-273.000.
Toho Rayon Co., Ltd.: *See*—
Nagata, Yasuhisa, 4,714,648, Cl. 428-245.000.
Toi, Koji: *See*—
Fukushima, Koji; Seto, Yoshiko; Kawada, Kazuhiro; Toi, Koji; and Kumashiro, Izumi, 4,714,713, Cl. 514-563.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Uneno, Tsunehisa; Kamata, Yutaka; and Miyazaki, Sinji, 4,714,668, Cl. 430-316.000.
Tomalia, Donald A.; and Wilson, Larry R., to Dow Chemical Company, The. Dense star polymers for calibrating/characterizing submicron apertures. 4,713,975, Cl. 73-865.800.
Tomita, Kazuo: *See*—
Yoshinaka, Tadaaki; Inoue, Takao; and Tomita, Kazuo, 4,714,965, Cl. 358-320.000.
Tomita, Seisuke: *See*—
Hashimoto, Takatsugu; Maehara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, 4,714,734, Cl. 524-496.000.
Tontarelli, Sergio. Plastic hanger with a grooved circular cross-section. 4,714,183, Cl. 223-91.000.
Tootle, James N.; and Martin, Eugene J., to Pneumo Corporation. Fluid actuator with feedback mechanism. 4,714,006, Cl. 92-5.00R.
Top Shelf Company, Inc.: *See*—
Wilcox, John R., 4,713,949, Cl. 68-235.00R.
Torelli, Guido: *See*—
Devecchi, Daniele; and Torelli, Guido, 4,714,845, Cl. 307-496.000.
Toriumi, Mototada: *See*—
Nishino, Fumio; Onoda, Shigeyoshi; Nomura, Akihiro; Mizutani, Morikazu; Kanemitsu, Shinji; and Toriumi, Mototada, 4,714,337, Cl. 355-3.0DR.
Tosaka, Yoichi: *See*—
Eguchi, Masaharu; Tosaka, Yoichi; Ohnuki, Ichiro; Aihara, Yoshihiko; and Ishizaki, Akira, 4,714,332, Cl. 354-21.000.
Toshiba Machine Co., Ltd.: *See*—
Koya, Hirokuni, 4,714,102, Cl. 164-457.000.
Suzuki, Akira, 4,714,933, Cl. 346-108.000.
Toshiba Silicone Co., Ltd.: *See*—
Hashimoto, Takatsugu; Maehara, Akihiro; Tomita, Seisuke; Funahashi, Yuichi; Watanabe, Junichiro; Sugiura, Kazuo; and Matsumoto, Hironori, 4,714,734, Cl. 524-496.000.
Toska Co., Ltd.: *See*—
Nishino, Hiroshi; and Okabe, Kazuo, 4,714,569, Cl. 252-511.000.
Tosswill, Christopher H., to Galileo Electro-Optics Corp. Higher frequency microchannel plate. 4,714,861, Cl. 315-117.000.
Toti, Andrew J. Structural beam and panel systems and methods and apparatus for making the same. 4,713,924, Cl. 52-731.000.
Tottori, Takumi; Oki, Kenji; Ooyama, Kazuo; and Mizushima, Toshio, to Honda Giken Kogyo Kabushiki Kaisha. Two-cycle engine. 4,714,056, Cl. 123-65.0PE.
Tovagliaro, Constantino, to Magnaghi Oleodinamica S.p.A. Gas-oil pressure accumulator. 4,714,094, Cl. 138-31.000.
Tovey, Stuart J., to Schlumberger Electronics (U.K.) Limited. Brazing eutectic and method. 4,714,189, Cl. 228-122.000.
Toyo Engineering Corporation: *See*—
Naito, Akio; Uozu, Hirohisa; and Numaguchi, Toru, 4,714,593, Cl. 422-197.000.
Zanma, Jun; Nishimura, Yoshinori; Shyoji, Kazuo; Shimagaki, Makoto; and Nakajima, Yoichi, 4,714,592, Cl. 422-192.000.
Toyo Seikan Kaisha, Ltd.: *See*—
Maruhashi, Yoshitsugu; Tanikawa, Isao; and Hirata, Sadao, 4,714,580, Cl. 264-516.000.
Toyoda Gosei Co., Ltd.: *See*—
Inui, Shuji; and Sano, Yoshio, 4,714,806, Cl. 200-61.550.
Toyoda, Katsuyoshi; and Murai, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Cryogenic vessel. 4,713,941, Cl. 62-50.000.
Toyoda Koki Kabushiki Kaisha: *See*—
Takagi, Masayoshi; Hoshino, Yukio; and Yamauchi, Hiroki, 4,713,876, Cl. 29-568.000.
Toyoshima, Yotaro: *See*—
Watabe, Seiji; Yokoyama, Isao; Sasaki, Masanori; Toyoshima, Yotaro; Takahashi, Sumio; and Maeda, Tsutomu, 4,714,908, Cl. 335-212.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,271, Cl. 280-707.000.
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,714,272, Cl. 280-707.000.
Harada, Yoshiharu; Taga, Yutaka; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,713,988, Cl. 74-868.000.
Hattori, Tetsuo; and Seko, Shoichi, 4,714,132, Cl. 180-312.000.
Ida, Shuichiro; Yoshinaka, Toshio; and Nagano, Shuji, 4,713,980, Cl. 74-467.000.
Kinaga, Eiichi; and Shiraishi, Daiichi, 4,713,862, Cl. 16-223.000.
Kobayashi, Fumiaki, 4,713,965, Cl. 73-119.00A.
Moroto, Shuzo; Sumiya, Koji; Watanabe, Kazuaki; Kubo, Seitoku; Kobayashi, Koji; and Taga, Yutaka, 4,714,146, Cl. 192-85.0AA.
Nagase, Masaomi; Takemoto, Eiji; Ibuki, Noritaka; and Hasegawa, Takashi, 4,714,068, Cl. 123-506.000.
Sawada, Kouji; Miura, Kiyokatsu; Suzuki, Keiichiro; Idosako, Hidetaka; and Kazusa, Hideo, 4,714,368, Cl. 403-132.000.
Yogo, Kenji, 4,714,193, Cl. 236-75.000.
Yoshinaka, Toshio; and Nagano, Shuji, 4,714,128, Cl. 180-247.000.
Toyotomi Kogyo Co., Ltd.: *See*—
Nakanishi, Yutaka; Yamada, Toshihiko; Sanada, Yuji; and Kawai, Takashi, 4,714,426, Cl. 431-132.000.
Traa, Einar O., to Tektronix, Inc. Voltage reference for transistor constant-current source. 4,714,872, Cl. 323-314.000.
Tracy, Stephen E., to Spider Staging, Inc. Method and apparatus for mounting a davit on a roof structure. 4,714,226, Cl. 240-544.000.
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Feichtlbauer, Werner, 4,714,266, Cl. 280-604.000.
Tranin, Jean-Pierre, to U.S. Philips Corporation. Buried system comprising a signalization device. 4,714,021, Cl. 102-401.000.
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Tread Corporation: *See*—
Cole, David M., 4,714,030, Cl. 109-61.000.
Trebilcock, Robert W.: *See*—
Cescon, Lawrence A.; Trebilcock, Robert W.; and Moffett, Robert H., 4,714,503, Cl. 149-21.000.
Treher, Elizabeth N.: *See*—
Feld, Thomas A.; Juri, Pedro N.; and Treher, Elizabeth N., 4,714,605, Cl. 424-1.100.
Tremblay, Paul A.; and Kearns, John J., to Liposome Company, Inc., The. Process for purification of phospholipids. 4,714,571, Cl. 260-403.000.
Trenchard, Paul M. Mixer for use with microwave oven. 4,714,813, Cl. 219-10.55F.
Trescol, Jean J.: *See*—
Guioth, Chantal H.; Maze, Etienne G.; and Trescol, Jean J., 4,714,531, Cl. 204-181.700.
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Puddephatt, Richard J.; and Treurnicht, Ilse, 4,714,627, Cl. 427-53.100.
Trevino, Juan A. V., to Hylsa, S.A. Corrosion inhibitor for CO_2 absorption process using alkanolamines. 4,714,597, Cl. 423-228.000.
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Palmero, Albert; and Hansen, Charles, 4,714,853, Cl. 310-257.000.
Triad Metal Products Company: *See*—
Jennings, Ralph N., 4,713,863, Cl. 24-20.00R.
Trinh Dinh, Chan; Desvard, Alain; and Martino, Germain, to Institut Francais du Petrole. Process for regenerating used catalysts by means of hydrogen peroxide aqueous solution stabilized with an organic compound. 4,714,688, Cl. 502-33.000.
Trivedi, Bharat, to Warner Lambert Company. N^6-bicycloadenosines and methods of use. 4,714,697, Cl. 514-46.000.
Troester, Helmut: *See*—
Wiedemann, Wolfgang; Spietschka, Ernst; and Troester, Helmut, 4,714,666, Cl. 430-59.000.
Troglio, Donald L.: *See*—
Mennie, John; Troglio, Donald L.; and Zielinski, Larry E., 4,713,926, Cl. 53-443.000.
Troletti, Bonifacio, to Honeywell Information Systems Italia. Digital apparatus for data recovery system. 4,714,968, Cl. 360-51.000.
True, Charles W., III; and Brady, John K., to Science Applications International Corporation. Frequency agile signal generator for emulating communications environments. 4,715,046, Cl. 375-61.000.
Trusco Tank Inc.: *See*—
Scott, Leslie D., 4,714,170, Cl. 220-5.00A.
TRW Inc.: *See*—
Materna, Anthony T.; Vossler, Roger A.; and Stepczyk, Frank M., 4,714,995, Cl. 364-200.000.
Thaniyavarn, Suwat, 4,714,312, Cl. 350-96.140.
Wood, Ruey E., 4,714,262, Cl. 280-95.00R.
Tsao, Utah. Gas cooling with heat recovery. 4,714,109, Cl. 165-104.180.
Tscheplak, Ernst: *See*—
Woerner, Guenter; Tscheplak, Ernst; and Moser, Franz, 4,714,449, Cl. 464-68.000.
Tsubakimoto, Giichi: *See*—
Inada, Shoshichiro; Furukawa, Kurune; Masui, Takachika; Honda, Keijiro; Ogasawara, Joji; and Tsubakimoto, Giichi, 4,714,791, Cl. 568-913.000.
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Tsuda, Jyou: *See*—
Yasuda, Keiji; Oda, Yukihisa; Hamajima, Shigemitsu; Ishii, Masami; Nakanishi, Katsumi; Tsuzuki, Takayoshi; and Tsuda, Jyou, 4,714,804, Cl. 200-11.0DA.
Tsugei, Shinji: *See*—
Inoue, Tomohiro; Tsugei, Shinji; and Iguchi, Shigeki, 4,715,010, Cl. 364-705.000.
Tsuruoka, Ichiro; and Takahashi, Mitsuru, to Ricoh Company, Ltd. Fixing device for copying machine. 4,714,427, Cl. 432-59.000.
Tsushima, Kazunori: *See*—
Matsuo, Noritada; Tsushima, Kazunori; Nishida, Sumio; and Yano, Toshihiko, 4,714,712, Cl. 514-531.000.
Tsuzuki, Takayoshi: *See*—
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Tufts, Wesley M.: *See*—
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Tung, Simon C.: *See*—
Wang, Su-Chee S.; and Tung, Simon C., 4,714,529, Cl. 204-56.100.
Turn-Luckily Intl., Ltd.: *See*—
Chen, Sun C., 4,714,805, Cl. 200-16.00A.
Turner, Graham N.: *See*—
Bailey, John W.; Hayter, Paul A.; Mason, Brian R.; and Turner, Graham N., 4,714,875, Cl. 324-73.0PC.
Turner, S. Richard; and Yanus, John F., to Xerox Corporation. Aromatic aryl amine polymers. 4,714,779, Cl. 564-330.000.
Tuvell, James A.; and Smayling, Michael C., to Texas Instruments Incorporated. Modified three transistor EEPROM cell. 4,715,014, Cl. 365-185.000.
Tyrell, John A.: *See*—
McCready, Russell J.; and Tyrell, John A., 4,714,753, Cl. 528-288.000.
McCready, Russell J.; and Tyrell, John A., 4,714,754, Cl. 528-288.000.
McCready, Russell J.; and Tyrell, John A., 4,714,755, Cl. 528-288.000.
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Matsubara, Katsumi; Uchida, Riichi; Muramatsu, Masatoshi; Naya, Kotaro; and Takagi, Tsuneharu, 4,714,418, Cl. 418-201.000.
Uchikawa, Naoshi: *See*—
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Udagawa, Tsunekazu, to Ishikawa Gasket Co. Ltd. Steel laminate gasket. 4,714,260, Cl. 277-235.00B.
Ueda, Kazuhiro; Yamaguchi, Toshiaki; Kajiyama, Kouji; and Matsumoto, Oxamu, to Mitsubishi Denki Kabushiki Kaisha. Electromagnetic proportional control valve. 4,714,089, Cl. 137-614.180.
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Minai, Masayoshi; and Ueda, Yuji, 4,714,782, Cl. 568-347.000.
Ueda, Yutaka: *See*—
Sato, Tsutomu; Umehara, Masaakira; Abe, Michiharu; Oba, Hideaki; and Ueda, Yutaka, 4,714,667, Cl. 430-270.000.
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Uhri, Duane C., to Mobil Oil Corporation. Hydraulic fracturing of a shallow subsurface formation. 4,714,115, Cl. 166-308.000.
Ujita, Tsugunobu; and Takahashi, Seiichi, to Kubota, Ltd. Axle reduction apparatus for tractor. 4,714,130, Cl. 180-262.000.
Ulrich, Harold C. Volleyball setting machine. 4,714,069, Cl. 124-26.000.
Umeda, Tadashi: *See*—
Iida, Kazumi; Ohata, Yosuke; Hyodo, Keiichiro; Akiyama, Kazunori; Umeda, Tadashi; and Kishimoto, Keiichi, 4,714,338, Cl. 355-3.0FU.
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Union Carbide Corporation: *See*—
Heggart, Ronald G.; McClintock, Willard K.; and Engstrom, Randy J., 4,715,042, Cl. 373-74.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Banbury, John R., 4,714,320, Cl. 350-174.000.
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Air Force: *See*—
Eylon, Daniel; and Froes, Francis H., 4,714,587, Cl. 419-29.000.
Holt, James F., 4,714,510, Cl. 437-2.000.
Lynch, Charles T.; Vahldiek, Fred W.; and Khobaib, Mohammad, 4,714,564, Cl. 252-110.000.
Yang, Andrew C.; Payne, Richard; and Soref, Richard A., 4,714,314, Cl. 350-96.200.
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Lau, Kam C.; and Hocken, Robert J., 4,714,339, Cl. 356-4.500.
Energy: *See*—
Arnold, Charles, Jr.; and Assink, Roger, 4,714,663, Cl. 429-101.000.
Blaushild, Ronald M., 4,714,228, Cl. 248-608.000.
Chen, Peter J., 4,714,848, Cl. 310-359.000.
Fraser, John S.; and Sheffield, Richard L., 4,715,038, Cl. 372-2.000.
Kast, Steven J., 4,714,585, Cl. 376-442.000.
Kaun, Thomas D.; and Smith, James L., 4,714,661, Cl. 429-14.000.
Swarr, Thomas E.; and Wnuck, Wayne G., 4,714,586, Cl. 419-2.000.
Health and Human Services: *See*—
Ito, Yoichiro, 4,714,554, Cl. 210-635.000.
U.S. Philips Corporation: *See*—
Auwerda, Cornelis P.; Geittner, Peter E. E.; and Lydtin, Hans-Jurgen, 4,714,589, Cl. 427-39.000.
Bertram, Leo; and Schemmann, Hugo, 4,714,851, Cl. 310-156.000.
Braun, Walter; Kersten, Reinhard; and Kuhl, Egbert, 4,714,822, Cl. 219-449.000.
Dannert, Horst; Ganser, Hans-Gunther; Schafer, Ralf; and Stormberg, Hans-Peter, 4,714,862, Cl. 315-244.000.
Eijsermans, Antonius A. C. C., 4,715,025, Cl. 369-75.200.
Hart, Cornelis M.; and Slob, Arie, 4,714,842, Cl. 307-477.000.
Hill, Bernhard, 4,714,325, Cl. 350-376.000.
Koster, Marinus P.; Soemers, Hermanus M. J. R.; and Dona, Marinus J. J., 4,713,977, Cl. 74-191.000.
Parker, John P., 4,715,065, Cl. 381-46.000.
Pesque, Patrick R.; and Nicolas, Jean-Marie C., 4,714,846, Cl. 310-317.000.
Sanders, Rudolf, 4,714,858, Cl. 313-318.000.
Schleimann-Jensen, Lars J.; and Anderson, Fred H. E., 4,714,214, Cl. 244-3.160.
Tranin, Jean-Pierre, 4,714,021, Cl. 102-401.000.
Vrijssen, Gerardus A. H. M., 4,713,879, Cl. 29-620.000.
United States Surgical Corporation: *See*—
Green, David T., 4,714,187, Cl. 227-19.000.
U.S. Tool & Die, Inc.: *See*—
Wachter, William J., 4,714,583, Cl. 376-261.000.
United Steel Products Company: *See*—
Sielaff, Ulrich; and Hamel, David O., 4,713,923, Cl. 52-713.000.

United Technologies Corporation: *See—*
Byrnes, Francis E.; Ferris, Donald L.; Hibyan, Edward S.; Noehren, William L.; and Ogle, Peter C., 4,714,450, Cl. 464-90.000.
Swarts, Richard E.; Moffatt, E. Marston; and Lopiccolo, Mario T., 4,714,815, Cl. 219-121.0LC.
Terkelsen, Bruce E., 4,714,101, Cl. 164-122.200.
Thayer, Edward B.; and Ward, Eric J., 4,714,197, Cl. 239-265.290.

University of Pittsburgh: *See—*
Dowd, Paul; Kaufman, Christopher; and Abeles, Robert H., 4,714,777, Cl. 562-506.000.

University of Rochester, The: *See—*
Pennisi, Kenneth; and Chimowitz, Eldred, 4,714,526, Cl. 203-49.000.

Unno, Tetsuji: *See—*
Horiki, Seinosuke; Makino, Reiji; Ito, Kuninori; and Unno, Tetsuji, 4,714,633, Cl. 427-282.000.

Unterleitner, Fred C.: *See—*
Kapany, Narinder S.; and Unterleitner, Fred C., 4,714,313, Cl. 350-96.160.

UOP Inc.: *See—*
Abrevaya, Hayim; and Targos, William M., 4,714,692, Cl. 502-261.000.
House, David W.; and Scott, Ray V., Jr., 4,714,512, Cl. 156-306.600.
Moser, Mark D.; and Lawson, Randy J., 4,714,538, Cl. 208-139.000.
Moser, Mark D.; and Lawson, R. Joe, 4,714,539, Cl. 208-139.000.
Moser, Mark D.; and Lawson, R. Joe, 4,714,540, Cl. 208-139.000.
Polak, Anthony J.; and Young, Ping, 4,714,482, Cl. 55-158.000.
Targos, William M., 4,714,693, Cl. 502-261.000.
Zinnen, Hermann A.; and Franczyk, Thad S., 4,714,783, Cl. 568-424.000.

Uozu, Hirohisa: *See—*
Naito, Akio; Uozu, Hirohisa; and Numaguchi, Toru, 4,714,593, Cl. 422-197.000.

Uranium Pechiney: *See—*
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Urbach, Hansjorg; Henning, Rainer; Teetz, Volker; and Becker, Reinhard, to Hoechst Aktiengesellschaft. Derivatives of cis, endo-2-azabicyclo[5.3.0]decane-3-carboxylic acid, and their use for treating hypertension. 4,714,708, Cl. 514-412.000.

Uredat-Neuhoff, Angela, to Inaba Seisakusho Ltd. Height adjustable table. 4,714,028, Cl. 108-144.000.

USEC, Inc.: *See—*
Bolden, Albert, 4,714,817, Cl. 219-121.0LK.

Usui, Masayuki; Imataki, Hiroyuki; Serizawa, Takashi; Baba, Takeshi; and Nose, Hiroyasu, to Canon Kabushiki Kaisha. Method and element for optical modulation. 4,714,326, Cl. 350-485.000.

Usui, Takeshi, to NEC Corporation. Light beam positioner with scan distortion compensation. 4,714,830, Cl. 250-234.000.

Vahldiek, Fred W.: *See—*
Lynch, Charles T.; Vahldiek, Fred W.; and Khobaib, Mohammad, 4,714,564, Cl. 252-110.000.

Valco/Valley Tool & Die, Inc.: *See—*
Heekin, Theodore R., 4,714,373, Cl. 403-402.000.

Valdemarsson, Stefan: *See—*
Schreurs, Emile; Joader, Stefan; and Valdemarsson, Stefan, 4,714,974, Cl. 361-12.000.

Valdez, Leandro: *See—*
Bohl, Aleck; Meyers, John; and Valdez, Leandro, 4,714,178, Cl. 222-107.000.

Valeo: *See—*
Alas, Jacques; and Bacher, Michel, 4,714,148, Cl. 192-107.00C.
Focqueur, Herve ; and Jumel, Bernard, 4,714,448, Cl. 464-68.000.

Vallieres, Francois. Sports shoe cover. 4,713,895, Cl. 36-1.500.

Vallourec: *See—*
Peytavin, Pierre, 4,713,955, Cl. 72-208.000.

Van Camp, Raymond E.: *See—*
Nidiffer, Charles A.; and Van Camp, Raymond E., 4,714,206, Cl. 241-100.000.

Vanderheiden, Dennis B., to Pfizer, Inc. Spherically shaped precipitated calcium carbonate, its preparation and use. 4,714,603, Cl. 423-432.000.

van Eijl, Ahazuerus T., to Dow Chemical Company, The. Process for separating an ethylenically unsaturated hydrocarbon from a hydrocarbon mixture. 4,714,793, Cl. 585-4.000.

Vankar, Vasant D.: *See—*
Chopra, Kasturi L.; Bunshah, Roitan F.; Deshpandey, Chandra V.; and Vankar, Vasant D., 4,714,625, Cl. 427-35.000.

van Zanten, Anton: *See—*
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Varian Associates, Inc.: *See—*
Cordts, Bernhard F., 4,714,641, Cl. 428-610.000.
Freeman, Kenneth F.; Garrett, Charles B.; Harra, David J.; and Lei, Lawrence C., 4,714,536, Cl. 204-298.000.

Varian Associates, Inc./Scientific Systems, Inc.: *See—*
Stone, Stanley A., 4,713,974, Cl. 73-864.230.

Varlet, Marc F. Latch assembly. 4,714,284, Cl. 292-91.000.

Vaughan, David E. W., to Exxon Research and Engineering Co. Process for preparing a high silica faujasite aluminosilicate, ECR-4. 4,714,601, Cl. 423-329.000.

Vaughn, Lawrence E., to General Signal Corporation. Fluid pressure brake control portion. 4,714,297, Cl. 303-33.000.

VEB Kombinat Fortschritt Landmaschinen: *See—*
John, Gunter; Kretschmer, Karl-Heinz; and Rollich, Jurgen, 4,714,204, Cl. 241-55.000.

Vernon, Patrick; and Ostiz, Jean-Claude, to Schlumberger Technology Corporation. System for recording a variable value, notably in a well, and for compressing stored measurement interval data. 4,715,002, Cl. 364-422.000.

Vetco Gray Inc.: *See—*
Brammer, Norman, 4,714,111, Cl. 166-182.000.

Vicik, Stephen J.: *See—*
Lustig, Stanley; Schuetz, Jeffrey M.; and Vicik, Stephen J., 4,714,638, Cl. 428-35.000.

Vickers, Incorporated: *See—*
Leemhuis, Richard S., 4,714,005, Cl. 91-361.000.

Vicon Industries, Inc.: *See—*
Pshtissky, Yacov A., 4,714,959, Cl. 358-184.000.

Victor, Karl-Heinz: *See—*
Heinrich, Juergen; Krauth, Axel; Victor, Karl-Heinz; and Peeken, Heinz, 4,714,257, Cl. 277-1.000.

Videocolor: *See—*
Poncet, Bernard, 4,714,497, Cl. 148-6.350.

Vidugiris, Bronis: *See—*
Kurtzman, Gary; Heck, Joseph P.; Hansen, Kenneth A.; Enderby, Ralph; and Vidugiris, Bronis, 4,714,899, Cl. 331-1.00A.

Vilmur, Richard J.: *See—*
Haddad, Kenneth R.; and Vilmur, Richard J., 4,715,063, Cl. 379-390.000.

Viomedics Inc.: *See—*
Theodoropulos, Spyros, 4,714,763, Cl. 544-31.000.

Viskase Corporation: *See—*
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Vivenzio, Robert L.: *See—*
Krauter, Allan I.; and Vivenzio, Robert L., 4,714,075, Cl. 128-4.000.

Vlasbloem, Hugo; and Duinker, Simon, to bv Optische Industrie"De Oude Delft". Apparatus for slit radiography. 4,715,056, Cl. 378-152.000.

Vogel, Richard M., to Eastman Kodak Company. Asynchronous still timing for a video camera producing movie or still images. 4,714,963, Cl. 358-213.260.

Vogt, Clifford M.: *See—*
Shipp, Peter W., Jr.; and Vogt, Clifford M., 4,714,647, Cl. 428-212.000.

Volk, Jack R.: *See—*
Crawford, Robert D.; Johnson, Wayne J.; Kimber, Theo, Jr.; Nolff, Douglas; Volk, Jack R.; and Franks, Donald C., 4,715,031, Cl. 370-85.000.

Volkmann, Robert A.: *See—*
Carroll, Ronnie D.; and Volkmann, Robert A., 4,714,761, Cl. 540-310.000.

von Kleinsorgen, Reinhard, to Schwan-Stabilo Schwanhausser GmbH & Co. Cosmetic stick for a powder pencil. 4,714,085, Cl. 132-88.700.

Von Ritter, Michael: *See—*
Keller, Hans W.; and Von Ritter, Michael, 4,715,003, Cl. 364-571.000.

von Rybinski, Wolfgang; Tesmann, Holger; and Dobias, Bohuslav, to Henkel Kommanditgesellschaft auf Aktien. Process for dressing kaolinite by flotation. 4,714,544, Cl. 209-167.000.

Voss-Spilker, Peter: *See—*
Keutgen, Franz; Kubon, Achim; Perings, Dieter; Stadler, Peter; Voss-Spilker, Peter; and Apel, Karl-Hermann, 4,714,105, Cl. 164-420.000.
Kubon, Achim; and Voss-Spilker, Peter, 4,714,106, Cl. 164-484.000.

Vossler, Roger A.: *See—*
Materna, Anthony T.; Vossler, Roger A.; and Stepczyk, Frank M., 4,714,995, Cl. 364-200.000.

Vrijssen, Gerardus A. H. M., to U.S. Philips Corporation. Method of manufacturing a device having an electric resistance layer and the use of the method. 4,713,879, Cl. 29-620.000.

W & A Bates Limited: *See—*
Goodfellow, Anthony G.; and Wright, Anthony R., 4,714,505, Cl. 156-64.000.

W. H. Brady Co.: *See—*
Aufderheide, Brian E., 4,714,631, Cl. 427-250.000.

W. R. Grace & Co.: *See—*
Ketley, Celia H., 4,714,726, Cl. 524-11.000.

Wachter, William J., to U.S. Tool & Die, Inc. Method and apparatus for compacting spent nuclear reactor fuel rods. 4,714,583, Cl. 376-261.000.

Wacker, Josef: *See—*
Goldmann, Horst; Einsle, Guenter; Brugger, Rudolf; and Wacker, Josef, 4,713,866, Cl. 29-33.00K.

Wagner, Wilfried R., to Emcore, Inc. Modular gas handling apparatus. 4,714,091, Cl. 137-884.000.

Wahl, Raymond C.: *See—*
Bull, Timothy B. H.; and Wahl, Raymond C., 4,713,898, Cl. 37-96.000.

Wainwright, Christopher E. Evaporative cooler including an air-to-air counter-flow heat exchanger having a reverse temperature profile. 4,713,943, Cl. 62-304.000.

Wakabayashi, Hiroshi: *See—*
Kazami, Kazuyuki; Nakamura, Toshiyuki; and Wakabayashi, Hiroshi, 4,714,938, Cl. 354-173.100.

Wakata, Hideo: *See—*
Imoto, Yuzo; Wakata, Hideo; Takei, Toshihiro; and Hattori, Yoshiyuki, 4,714,296, Cl. 303-6.00C.
Yogo, Kazutoshi; and Wakata, Hideo, 4,714,864, Cl. 318-52.000.

Wako Pure Chemical Industries, Ltd.: *See*—
Miyashita, Yoshinobu; Hamanaka, Tadashi; and Iwata, Kenzi, 4,714,675, Cl. 435-32.000.
Waldmann, Helmut: *See*—
Stammann, Gunter; Kricsfalussy, Zoltan; Waldmann, Helmut; Schneider, Joachim; and Medem, Harald, 4,714,689, Cl. 502-54.000.
Walk, Bruce M.: *See*—
Livingston, David L.; Sucher, Daniel J.; and Walk, Bruce M., 4,714,993, Cl. 364-200.000.
Walker, Donald E.: *See*—
Coombes, Robert L., Jr.; Owen, Merrill J.; Colwell, Terance C.; and Walker, Donald E., 4,714,535, Cl. 204-297.00W.
Walker, Donald G.: *See*—
Brundidge, Steven P.; Brodfuehrer, Paul R.; Sapino, Chet, Jr.; Shih, Kun M.; and Walker, Donald G., 4,714,760, Cl. 540-222.000.
Walkup, William B., to Augat Inc. Low profile lead socket. 4,714,442, Cl. 439-844.000.
Wallin, Per Olov T.; Warell, Bengt H.; Svensson, Ake P.; Lundstrom, Kurt A.; and Johansson, Lars A. Arrangement for a switchboard desk. 4,714,025, Cl. 108-20.000.
Walsh, Shawn T.: *See*—
Simmons, Arturo; Walsh, Shawn T.; and Roberts, Charles G., 4,714,949, Cl. 357-23.130.
Walters, LeRoy M.: *See*—
Counter, Louis F.; Born, Richard C.; Walters, LeRoy M.; Ziese, Lowell B.; and Searing, Lawrence G., 4,714,917, Cl. 340-679.000.
Wan, Chung-Zong; and Dettling, Joseph C., to Engelhard Corporation. Aluminum-stabilized ceria catalyst compositions, and methods of making the same. 4,714,694, Cl. 502-304.000.
Wands, Jack R.: *See*—
Shouval, Daniel; Shafritz, David A.; and Wands, Jack R., 4,714,613, Cl. 424-86.000.
Wang, Kathy K.; Gustavson, Larry J.; and Dumbleton, John H., to Pfizer Hospital Products Group Inc. Prosthesis formed from dispersion strengthened cobalt-chromium-molybdenum alloy produced by gas atomization. 4,714,468, Cl. 623-16.000.
Wang, Su-Chee S.; and Tung, Simon C., to General Motors Corporation. Method of coating metal surfaces in oil-based lubricants. 4,714,529, Cl. 204-56.100.
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Hancock, Bynum V., 4,714,410, Cl. 416-193.00A.
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Kemeny, George A., 4,714,003, Cl. 89-8.000.
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Whiting, Peter E. Mobile brush cutter. 4,713,930, Cl. 56-10.800.

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Willems, David A., to ITT Aerospace Optical. Magnetostatic wave device unit. 4,714,904, Cl. 333-148.000.
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Willis, Jeffrey D., to Rolls-Royce plc. Gas turbine engine gaseous fuel injector. 4,713,938, Cl. 60-742.000.
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Wirtgen, Reinhard. Scraping roller mounting means for scraping machines for scraping off roads. 4,714,295, Cl. 299-39.000.
Wisegerber, Lester R. Waffle safety device. 4,714,131, Cl. 180-287.000.
Witt, Frank A., to Colite Industries, Inc. Method forming three dimensional sign display character. 4,714,581, Cl. 264-553.000.
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Wood, Ruey E., to TRW Inc. Variable length tie rod assembly. 4,714,262, Cl. 280-95.00R.
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Yamaguchi, Akio; and Yoshikawa, Kazushi, to Honda Giken Kogyo Kabushi Kaisha. Pallet for material handling. 4,714,026, Cl. 108-51.100.
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Yamakawa, Kiyoshi; and Yoshimoto, Satoshi, to Brother Kogyo Kabushiki Kaisha. Stepper motor homing method and system. 4,714,361, Cl. 400-144.200.
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Yamanaka, Kazuo; Nagano, Hiroo; Minami, Takao; Okada, Yaautaka; Inoue, Mamoru; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; Sasaguri, Nobuya; Kawaguchi, Katsuji; and Kusakabe, Takaya, to Mitsubishi Jukogyo Kabushiki Kaisha; and Sumitomo Metal Industries, Ltd. Method for thermal treatment of alloy for heat transfer pipes. 4,714,501, Cl. 148-13.000.
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Yamashiro, Hiroshi; and Suzuki, Ko. Method for making a dunnage shock absorber. 4,714,506, Cl. 156-80.000.
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Yamashita, Shinichi: *See*—
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Yang, Andrew C.; Payne, Richard; and Soref, Richard A., to United States of America, Air Force. Mode dependent, optical time delay system for electrical signals. 4,714,314, Cl. 350-96.200.

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Yeo, David E., to Scientific Drilling International. Detection means for mud pulse telemetry system. 4,715,022, Cl. 367-83.000.

Yin, Ronald L. Color display apparatus and method therefor. 4,714,956, Cl. 358-60.000.

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Yamakawa, Kiyoshi; and Yoshimoto, Satoshi, 4,714,361, Cl. 400-144.200.

Yoshimoto, Yoshikazu: *See*—
Higashigaki, Yoshiyuki; Yoshimoto, Yoshikazu; Suzuki, Tomonari; Nakajima, Shigeo; and Inoguchi, Toshio, 4,714,639, Cl. 428-36.000.

Yoshimura, Hiroshi: *See*—
Matsumura, Tetsuo; Ohzawa, Toshio; Kawashima, Akihiro; Ohkuma, Osamu; Sawada, Saburo; Yanai, Shun'ichi; Yoshimura, Hiroshi; and Sugino, Yasuo, 4,714,543, Cl. 208-412.000.

Yoshimura, Shinichi: *See*—
Ohkuma, Kuniaki; Nakagawa, Reiji; Miyao, Hisao; Yoshimura, Shinichi; Suzuki, Toshio; Hayashi, Toyoaki; Arakawa, Masayasu; and Koizumi, Hideharu, 4,714,397, Cl. 414-222.000.

Yoshinaga, Kazuo: *See*—
Katagiri, Kazuharu; Yoshinaga, Kazuo; Okada, Shinjiro; and Kanbe, Junichiro, 4,714,323, Cl. 350-350.00S.

Yoshinaka, Tadaaki; and Inoue, Takao, to Sony Corporation. Read start pulse generator for time base corrector. 4,714,954, Cl. 358-19.000.

Yoshinaka, Tadaaki; Inoue, Takao; and Tomita, Kazuo, to Sony Corporation. Write clock pulse generator used for a time base corrector. 4,714,965, Cl. 358-320.000.

Yoshinaka, Toshio; and Nagano, Shuji, to Toyota Jidosha Kabushiki Kaisha. Stop member mechanism for use in a four-wheel drive vehicle. 4,714,128, Cl. 180-247.000.

Yoshinaka, Toshio: *See*—
Ida, Shuichiro; Yoshinaka, Toshio; and Nagano, Shuji, 4,713,980, Cl. 74-467.000.

Yoshino, Motoaki: *See*—
Kiya, Nobuyuki; and Yoshino, Motoaki, 4,714,999, Cl. 364-474.000.

Yoshioka, Hiroshi: *See*—
Itoh, Kunio; Fukuda, Takeshi; and Yoshioka, Hiroshi, 4,714,733, Cl. 524-493.000.

Yoshiura, Syoichiro, to Sharp Kabushiki Kaisha. Variable-magnification copying machine with automatic magnification. 4,714,944, Cl. 355-55.000.

Young, Leon; and Klassen, Edward J., deceased (by Klassen, Amelia K., legal representative), to Fotima International Ltd. Camera carrier. 4,714,184, Cl. 224-253.000.

Young, Ping: *See*—
Polak, Anthony J.; and Young, Ping, 4,714,482, Cl. 55-158.000.

Youssefyeh, Rina. Skin treatment compositions comprising unoxidized nerve tissue. 4,714,615, Cl. 424-95.000.

Yuhaku, Satoru: *See*—
Nakatani, Seiichi; Yuhaku, Satoru; Okinaka, Hideyuki; Ishida, Toru; Makino, Osamu; and Kikuchi, Tatsuro, 4,714,570, Cl. 252-518.000.

Yui, Yoshikiyo: *See*—
Oda, Kazuyuki; Yui, Yoshikiyo; Kataoka, Yoshiharu; and Hata, Hideo, 4,714,331, Cl. 353-122.000.

Yun, John M.: *See*—
Stipanuk, John M.; and Yun, John M., 4,714,435, Cl. 439-496.000.

Zaccone, Samuel G. Engine sump draining device. 4,714,138, Cl. 184-1.500.

Zach, Joachim: *See*—
Rose, Harald; Zach, Joachim; and Lischke, Burkhard, 4,714,833, Cl. 250-397.000.

Zahn, Werner, to Deere & Company. Remote actuating mechanism. 4,713,981, Cl. 74-479.000.

Zanma, Jun; Nishimura, Yoshinori; Shyoji, Kazuo; Shimagaki, Makoto; and Nakajima, Yoichi, to Toyo Engineering Corporation. Radial flow catalytic reactor including heat exchange apparatus within the bed. 4,714,592, Cl. 422-192.000.

Zeevi, Yehoshua Y.; and Medina, Antonio. Apparatus for relief illusion. 4,714,319, Cl. 350-144.000.

Zeller, Gregor, to Petri A.G. Electric contact device for protective gas bag impact installations in automotive vehicles. 4,714,430, Cl. 439-15.000.

Zenith Electronics Corporation: *See*—
Foster, Mark J., 4,714,919, Cl. 340-726.000.

Zielinski, Larry E.: *See*—
Mennie, John; Troglio, Donald L.; and Zielinski, Larry E., 4,713,926, Cl. 53-443.000.

Ziese, Lowell B.: *See*—
Counter, Louis F.; Born, Richard C.; Walters, LeRoy M.; Ziese, Lowell B.; and Searing, Lawrence G., 4,714,917, Cl. 340-679.000.

Zimmer, Inc.: *See*—
Webb, John D., Jr.; Hori, Roy Y.; and Simpson, George E., 4,714,470, Cl. 623-18.000.

Zimmermann, Rainer: *See*—
Roch, Josef; Heckel, Armin; Nicki, Josef; Muller, Erich; Narr, Berthold; Zimmermann, Rainer; and Weisenberger, Johannes, 4,714,698, Cl. 514-212.000.

Zinnen, Hermann A.; and Franczyk, Thad S., to UOP Inc. Separation of nitrobenzaldehyde isomers. 4,714,783, Cl. 568-424.000.

Ziyad Incorporated: *See*—
Staniszewski, Tadeusz, 4,714,243, Cl. 271-171.000.

Zlotky, Richard A.: *See*—
Skinner, Jerald P.; Zlotky, Richard A.; and Diel, Robert L., 4,714,225, Cl. 248-523.000.

Zolnowsky, John: *See*—
MacGregor, Douglas B.; Zolnowsky, John; and Mothersole, David, 4,715,013, Cl. 364-900.000.

Zott, Werner, to Stahlecker, Fritz; and Stahlecker, Hans. Supporting disk for a supporting-disk bearing of an open-end spinning machine. 4,713,932, Cl. 57-406.000.

Zoueki, Georges. Lens and pattern holder. 4,713,912, Cl. 51-101.0LG.

Zumwalt, Gary L.: *See*—
Medlin, William L.; and Zumwalt, Gary L., 4,715,019, Cl. 367-31.000.

Zygraich, Nathan: *See*—
Delgoffe, Jean-Claude; Lobmann, Michele; and Zygraich, Nathan, 4,714,678, Cl. 435-235.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Hiraiwa, Kazuyoshi, to Nissan Motor Company, Limited. Four-wheel vehicle drive system. Re. 32,565, Cl. 180-249.000.

Nissan Motor Company, Limited: *See*—
Hiraiwa, Kazuyoshi, Re. 32,565, Cl. 180-249.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Cetus Corporation: *See*—
Frankel, Arthur E.; Johnson, Larry J.; and Wennberg, Timothy J., B1 4,555,957, Cl. 73-864.140.

Davenport, John; and Russo, Michael A., to TI (Group Services) Limited. Controlling current density. B1 4,587,458, 12-22-87, Cl. 315-111.010.

Frankel, Arthur E.; Johnson, Larry J.; and Wennberg, Timothy J., to Cetus Corporation. Bi-directional liquid sample handling system. B1 4,555,957, 12-22-87, Cl. 73-864.140.

Johnson, Larry J.: *See*—
Frankel, Arthur E.; Johnson, Larry J.; and Wennberg, Timothy J., B1 4,555,957, Cl. 73-864.140.

Russo, Michael A.: *See*—
Davenport, John; and Russo, Michael A., B1 4,587,458, Cl. 315-111.010.

TI (Group Services) Limited: *See*—
Davenport, John; and Russo, Michael A., B1 4,587,458, Cl. 315-111.010.

Wennberg, Timothy J.: *See*—
Frankel, Arthur E.; Johnson, Larry J.; and Wennberg, Timothy J., B1 4,555,957, Cl. 73-864.140.

LIST OF DESIGN PATENTEES

A-Dec, Inc.: *See*—
Nordstrom, Carl G.; and Parlier, Matthew H., 293,371, Cl. D24-5.000.

Abe, Takashi: *See*—
Hoshino, Naoko; Abe, Takashi; and Suzuki, Yosuke, 293,322, Cl. D14-71.000.

Abe, Takeshi: *See*—
Gotou, Atsuyuki; Shibayama, Masato; Abe, Takeshi; Hisatomi, Ryouichi; and Sasaki, Takeshi, 293,324, Cl. D15-199.000.

Abrams, Robert C.: *See*—
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,304, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,305, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,306, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,307, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,308, Cl. D11-164.000.

Acoustiguide Corporation: *See*—
Demenus, Richard, 293,316, Cl. D14-6.000.

Alfer, Jaroslaw G. Seat cushion. 293,286, 12-22-87, Cl. D6-596.000.

Alkire, Merrill D. Ear cleaner. 293,378, 12-22-87, Cl. D24-59.000.

American Telephone & Telegraph Company, AT&T Information Systems Inc.: *See*—
Kowalik, John; Longhitano, Ronald; Miggels, Stephen G.; Shakespeare, Walter J.; and Varadarajan, G., 293,321, Cl. D14-60.000.

Andersen, Edel S.: *See*—
Ryaa, Jan; and Andersen, Edel S., 293,341, Cl. D21-108.000.

Anderson, Lloyd E., Sr., to Pitt-Des Moines Inc. Elevated water tank. 293,360, 12-22-87, Cl. D23-202.000.

Arcair Company: *See*—
Chaney, David B., 293,296, Cl. D8-30.000.

Ashford, L. James. Portable seat. 293,282, 12-22-87, Cl. D6-368.000.

Attwood Corporation: *See*—
Whitley, Warwick M., II, 293,361, Cl. D23-231.000.

Bardsley, Harold B.: *See*—
Slattery, Ian; Bardsley, Harold B.; and Beverly, Ian, 293,323, Cl. D15-78.000.

Beck, Stephen C. Headset for use in applying electrical signals to the temples. 293,373, 12-22-87, Cl. D24-17.000.

Ben-Zeev, Avry: *See*—
Cauque, Michele; and Ben-Zeev, Avry, 293,287, Cl. D3-62.000.

Beverly, Ian: *See*—
Slattery, Ian; Bardsley, Harold B.; and Beverly, Ian, 293,323, Cl. D15-78.000.

Bienwald, Wolfgang F.: *See*—
Justiano, Joseph G.; and Bienwald, Wolfgang F., 293,313, Cl. D13-27.000.

Blackwell, James C. Water holding tub for sun tanning. 293,376, 12-22-87, Cl. D24-39.000.

Brookshire, Phillip L.: *See*—
O'Neil, William J., Jr.; Jones, David A.; and Brookshire, Phillip L., 293,366, Cl. D23-366.000.

Brule, Paul L., to Ventureprise, Inc. Conveyor. 293,384, 12-22-87, Cl. D34-29.000.

Bua, Jeffrey P., to Reebok International, Ltd. Shoe sole. 293,275, 12-22-87, Cl. D2-320.000.

Bulgari, Marina, to Marina B Creation S.A. Necklace. 293,303, 12-22-87, Cl. D11-3.000.

Burgdorf, Fred. Paper clip. 293,337, 12-22-87, Cl. D19-65.000.

Burlington Basket Company: *See*—
Thompson, Rick L., 293,383, Cl. D32-37.000.

Butt, Thomas E. Dental pick. 293,372, 12-22-87, Cl. D24-10.000.

Cal-Surgical, Inc.: *See*—
Sanderson, Ronald A.; Wilson, John L.; and Maples, Nolan M., 293,370, Cl. D24-3.000.

Calkin, Linda L. Doll. 293,351, 12-22-87, Cl. D21-166.000.

Calkin, Linda L. Doll. 293,352, 12-22-87, Cl. D21-166.000.

Casio Computer Co., Ltd.: *See*—
Nikaido, Takashi; Ono, Yoshio; and Wada, Masao, 293,300, Cl. D10-32.000.

Cauque, Michele; and Ben-Zeev, Avry, to Sparklight Corporation. Combined key ring, torch, photograph holder and LCD watch. 293,287, 12-22-87, Cl. D3-62.000.

Chadbourne, Gilbert R., to Keyes Fibre. Urine measuring jug. 293,377, 12-22-87, Cl. D24-56.000.

Chaney, David B., to Arcair Company. Torch for exothermic cutting electrodes. 293,296, 12-22-87, Cl. D8-30.000.

Charles, Harold E.: *See*—
Robertson, James R.; and Charles, Harold E., 293,309, Cl. D12-6.000.

Clark, Gary N.; Jones, Kirk H.; and Welburn, Edward T., Jr., to General Motors Corporation. Vehicle body. 293,310, 12-22-87, Cl. D12-90.000.
Clarks Limited: *See*—
Radford, Alfred D., 293,270, Cl. D2-313.000.
Combi Co., Ltd.: *See*—
Nakao, Shinroku; Ishii, Yoshiyasu; and Hanashima, Taira, 293,329, Cl. D21-78.000.
Cron, Kenneth D.; and Sauvigne', Nannette, to STL, Enterprises. Toothbrush. 293,288, 12-22-87, Cl. D4-104.000.
Deering, Michael H. Bar scale template. 293,301, 12-22-87, Cl. D10-62.000.
de Meij, Seel. Boot sole. 293,272, 12-22-87, Cl. D2-320.000.
de Meij, Seel. Boot sole. 293,273, 12-22-87, Cl. D2-320.000.
Demenus, Richard, to Acoustiguide Corporation. Portable cassette player. 293,316, 12-22-87, Cl. D14-6.000.
Denny, Lee: *See*—
Hannah, Bruce P.; McClanahan, David D.; and Denny, Lee, 293,314, Cl. D13-40.000.
Denny, Thomas, to Johnson & Johnson Products Inc. Surgical laparotomy pad. 293,375, 12-22-87, Cl. D24-34.000.
Dexter-Portfolio Co., The: *See*—
Latta, Leigh C., III, 293,330, Cl. D21-159.000.
Latta, Leigh C., III, 293,343, Cl. D21-148.000.
Don Evans, Inc.: *See*—
Evans, Dale M., 293,279, Cl. D3-35.000.
Drackett Company, The: *See*—
O'Neil, William J., Jr.; Jones, David A.; and Brookshire, Phillip L., 293,366, Cl. D23-366.000.
Drag Specialties, Inc.: *See*—
Stahel, Alwin J., 293,312, Cl. D12-186.000.
Eastman Kodak Company: *See*—
Fricke, W. Patrick; and Harrison, Larry D., 293,327, Cl. D16-32.000.
Leonard, Bruce A., 293,326, Cl. D16-6.000.
Edwards, Peter; Steinhilber, Budd; and Gilliam, Ken, to Harmony Foods, Inc. Combination food container and scoop. 293,289, 12-22-87, Cl. D7-79.000.
Egly, Robert A. Case for magnetic media, programs and the like. 293,335, 12-22-87, Cl. D19-27.000.
Eldon Industries, Inc.: *See*—
Evenson, Mel, 293,338, Cl. D19-67.000.
Evenson, Mel, 293,339, Cl. D20-10.000.
El-Hag, Nabil: *See*—
Finsilver, Charles E.; Taylor, Terry L.; Worm, Roger E.; and El-Hag, Nabil, 293,292, Cl. D7-16.000.
Erlewine, Mark; and Squier, William. Guitar. 293,331, 12-22-87, Cl. D17-14.000.
Evans, Dale M., to Don Evans, Inc. Diskette file box. 293,279, 12-22-87, Cl. D3-35.000.
Evenson, Mel, to Eldon Industries, Inc. Stamp dispenser. 293,338, 12-22-87, Cl. D19-67.000.
Evenson, Mel, to Eldon Industries, Inc. Signboard. 293,339, 12-22-87, Cl. D20-10.000.
Everard, Lloyd. Inflatable bathtub. 293,363, 12-22-87, Cl. D23-277.000.
Everard, Lloyd. Inflatable sink. 293,364, 12-22-87, Cl. D23-289.000.
Excellente, Richard. Electric guitar body. 293,333, 12-22-87, Cl. D17-20.000.
Fabrique Ebel, Societe Anonyme: *See*—
Schoepfer, Eddy, 293,302, Cl. D11-3.000.
Fenner, Paul A. Cocktail composer guide. 293,336, 12-22-87, Cl. D19-64.000.
Fetterman, Douglas L., to Kenner Parker Toys Inc. Toy figure. 293,350, 12-22-87, Cl. D21-166.000.
Finsilver, Charles E.; Taylor, Terry L.; Worm, Roger E.; and El-Hag, Nabil, to General Foods Corporation. Covered entree plate. 293,292, 12-22-87, Cl. D7-16.000.
Fish, Falk: *See*—
Herzberg, Max; and Fish, Falk, 293,374, Cl. D24-17.000.
Formenti, Marco. Sofa. 293,283, 12-22-87, Cl. D6-381.000.
Fricke, W. Patrick; and Harrison, Larry D., to Eastman Kodak Company. Control panel for a copier or the like. 293,327, 12-22-87, Cl. D16-32.000.
Fujiyama, Mamoru, to Zojirushi Vacuum Bottle Co., Ltd. Vacuum bottle. 293,294, 12-22-87, Cl. D7-77.000.
General Foods Corporation: *See*—
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General Motors Corporation: *See*—
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George, Ivan T. Wick bearing lighting device. 293,365, 12-22-87, Cl. D7-416.000.
Gilliam, Ken: *See*—
Edwards, Peter; Steinhilber, Budd; and Gilliam, Ken, 293,289, Cl. D7-79.000.
Gomez, Stephen D.: *See*—
Schmidt-Devlin, Ellen; and Gomez, Stephen D., 293,276, Cl. D2-321.000.
Gotou, Atsuyuki; Shibayama, Masato; Abe, Takeshi; Hisatomi, Ryouichi; and Sasaki, Takeshi, to Hitachi, Ltd. Industrial robot. 293,324, 12-22-87, Cl. D15-199.000.
Gust, James M.; and Yoder, Ronald L. Adjustable fishing rod support. 293,359, 12-22-87, Cl. D22-147.000.
Hanashima, Taira: *See*—
Nakao, Shinroku; Ishii, Yoshiyasu; and Hanashima, Taira, 293,329, Cl. D21-78.000.
Hannah, Bruce P.; McClanahan, David D.; and Denny, Lee, to Knoll International, Inc. Work station spine assembly. 293,314, 12-22-87, Cl. D13-40.000.
Hansen, Erik L., to Rosti A/S. Punch cup. 293,291, 12-22-87, Cl. D7-9.000.
Harmony Foods, Inc.: *See*—
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Harrison, Larry D.: *See*—
Fricke, W. Patrick; and Harrison, Larry D., 293,327, Cl. D16-32.000.
Hartzell, Robert H.: *See*—
Perusek, Allan J.; Jablonski, Ernest F.; and Hartzell, Robert H., 293,369, Cl. D24-2.000.
Hase, Mark A.: *See*—
Murphy, Marvin G.; and Hase, Mark A., 293,328, Cl. D14-102.000.
Hearn, David E. Fish carrier. 293,358, 12-22-87, Cl. D22-134.000.
Heilig, Mort, to Supercruiser, Inc. Scooter. 293,340, 12-22-87, Cl. D21-81.000.
Herzberg, Max; and Fish, Falk, to Orgenics, Ltd. Assay cards. 293,374, 12-22-87, Cl. D24-17.000.
Hestair Kiddicraft Limited: *See*—
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Highland Supply Corporation: *See*—
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,304, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,305, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,306, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,307, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; and Abrams, Robert C., 293,308, Cl. D11-164.000.
Hill, Charles P.; and Spangler, Anthony G., to Masco Corporation of Indiana. Faucet. 293,362, 12-22-87, Cl. D23-241.000.
Hisatomi, Ryouichi: *See*—
Gotou, Atsuyuki; Shibayama, Masato; Abe, Takeshi; Hisatomi, Ryouichi; and Sasaki, Takeshi, 293,324, Cl. D15-199.000.
Hitachi, Ltd.: *See*—
Gotou, Atsuyuki; Shibayama, Masato; Abe, Takeshi; Hisatomi, Ryouichi; and Sasaki, Takeshi, 293,324, Cl. D15-199.000.
Ho, Chin-Chou. Connector for attaching an infant seat to a table. 293,285, 12-22-87, Cl. D6-491.000.
Holden, Lawrence. Floatation aid. 293,356, 12-22-87, Cl. D21-238.000.
Horiuchi, Hiroshi, to Tomy Kogyo Co., Inc. Toy robot. 293,346, 12-22-87, Cl. D21-150.000.
Hoshino, Naoko; Abe, Takashi; and Suzuki, Yosuke, to Kabushiki Kaisha Toshiba. Audio tuner. 293,322, 12-22-87, Cl. D14-71.000.
Humbert, James R. Paper guide clip. 293,334, 12-22-87, Cl. D18-22.000.
Ichikawa, Kaname, to Modern Royal Co., Ltd. Lighter or the like. 293,382, 12-22-87, Cl. D27-41.000.
Igoe, Brian F., to Reebok International, Ltd. Shoe sole. 293,274, 12-22-87, Cl. D2-320.000.
Integral Design, Inc.: *See*—
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Interlego A.G.: *See*—
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Ishii, Yoshiyasu: *See*—
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Isles, Patricia J. Cup holder. 293,293, 12-22-87, Cl. D7-70.000.
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Perusek, Allan J.; Jablonski, Ernest F.; and Hartzell, Robert H., 293,369, Cl. D24-2.000.
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Suzuki, Yosuke; and Sano, Takahide, 293,315, Cl. D14-84.000.
Karamian, Narbik A., to Raf-Tan Inc. Microwave distillation apparatus. 293,368, 12-22-87, Cl. D23-207.000.
Kato, Takaharu, to Ricoh Company, Ltd. Camera. 293,325, 12-22-87, Cl. D16-6.000.
Kenner Parker Toys Inc.: *See*—
Fetterman, Douglas L., 293,350, Cl. D21-166.000.
Keyes Fibre: *See*—
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Kikkawa, Hiroshi: *See*—
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Knoll International, Inc.: *See*—
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Kowalik, John; Longhitano, Ronald; Miggels, Stephen G.; Shakespeare, Walter J.; and Varadarajan, G., to American Telephone & Telegraph Company, AT&T Information Systems Inc. Telephone stand. 293,321, 12-22-87, Cl. D14-60.000.
Larson, Lawrence L.: *See*—
Ruger, William B.; and Larson, Lawrence L., 293,357, Cl. D22-108.000.
Latino, Richard M.: *See*—
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Latta, Leigh C., III, to Dexter-Portfolio Co., The. Stuffed toy ferret. 293,343, 12-22-87, Cl. D21-148.000.
Leonard, Bruce A., to Eastman Kodak Company. Camera. 293,326, 12-22-87, Cl. D16-6.000.
Leviton Manufacturing Company, Inc.: *See*—
Justiano, Joseph G.; and Bienwald, Wolfgang F., 293,313, Cl. D13-27.000.
Link, Helmut D., to Waldemar Link GmbH & Co. Finger splint. 293,379, 12-22-87, Cl. D24-64.000.
Liptak, Richard M., to Integral Design, Inc. Combination sign card and photograph holder. 293,280, 12-22-87, Cl. D6-314.000.
Longhitano, Ronald: *See*—
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Lussier, Edward, to Reebok International, Ltd. Shoe sole. 293,271, 12-22-87, Cl. D2-320.000.
Maples, Nolan M.: *See*—
Sanderson, Ronald A.; Wilson, John L.; and Maples, Nolan M., 293,370, Cl. D24-3.000.
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ISSUED DECEMBER 22, 1987

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104.18 4,714,109

CLASS 166

68 4,714,110
182 4,714,111
252 4,714,112
270 4,714,113
280 4,714,114
308 4,714,115
321 4,714,116
380 4,714,117

CLASS 174

42 4,714,799
73 R 4,714,800
88 R 4,714,801

CLASS 175

20 4,714,119
26 4,714,118
329 4,714,120

CLASS 177

134 4,714,121
139 4,714,122

CLASS 178

1 4,714,802

CLASS 180

14.4 4,714,123
20 4,714,140
168 4,714,124
182 4,714,125
233 4,714,126
4,714,127
247 4,714,128
248 4,714,129
249 Re.32,565
262 4,714,130
287 4,714,131
312 4,714,132

CLASS 181

160 4,714,133

CLASS 182

3 4,714,134
6 4,714,135
107 4,714,136
193 4,714,137

CLASS 184

1.5 4,714,138
6.11 4,714,139

CLASS 188

20 4,714,141
185 4,714,142

CLASS 190

115 4,714,143

CLASS 192

0.052 4,714,145
0.084 4,714,144
41 R 4,714,803
85 AA 4,714,146
87.15 4,714,147
107 C 4,714,148

CLASS 196

98 4,714,524

CLASS 198

312 4,714,149
347 4,714,152
457 4,714,153
463.3 4,714,150
514 4,714,154
619 4,714,155
860.5 4,714,151

CLASS 200

11 DA 4,714,804
16 A 4,714,805
61.55 4,714,806
144 B 4,714,807

CLASS 203

10 4,714,525
49 4,714,526

CLASS 204

1 T 4,714,527
33 4,714,528
56.1 4,714,529
131 4,714,530
181.7 4,714,531
4,714,532
262 4,714,533
269 4,714,534
297 W 4,714,535

298 4,714,536

CLASS 206

296 4,714,156
309 4,714,157
349 4,714,158
4,714,159
385 4,714,160
387 4,714,161
419 4,714,162
518 4,714,163
4,714,164

CLASS 208

111 4,714,537
139 4,714,538
4,714,539
4,714,540
161 4,714,541
347 4,714,542
412 4,714,543

CLASS 209

167 4,714,544

CLASS 210

101 4,714,545
137 4,714,546
169 4,714,547
221.2 4,714,548
224 4,714,549
244 4,714,550
278 4,714,551
329 4,714,552
533 4,714,553
635 4,714,554
4,714,555
638 4,714,556
769 4,714,557
776 4,714,558

CLASS 211

11 4,714,165
113 4,714,166

CLASS 215

270 4,714,167

CLASS 219

9.5 4,714,808
10.43 4,714,809
10.55 A 4,714,812
10.55 F 4,714,811
4,714,813
10.55 M 4,714,810
79 4,714,814
109 4,714,816
121 LC 4,714,815
121 LK 4,714,817
123 4,714,818
216 4,714,819
222 4,714,820
326 4,714,821
449 4,714,822

CLASS 220

1 T 4,714,168
5 A 4,714,170
8 4,714,169
85 VR 4,714,171
86 R 4,714,172
90.4 4,714,173
4,714,174
216 4,714,175

CLASS 222

51 4,714,176
58 4,714,177
107 4,714,178
148 4,714,179
456 4,714,180
480 4,714,181

CLASS 223

46 4,714,182
91 4,714,183

CLASS 224

253 4,714,184

CLASS 226

74 4,714,185

CLASS 227

19 4,714,187
146 4,714,186

CLASS 228

120 4,714,188
122 4,714,189

CLASS 229

1.5 B 4,714,190
121 4,714,191

CLASS 232

17 4,714,192

CLASS 236

75 4,714,193

CLASS 237

70 4,714,194

CLASS 238

349 4,714,195

CLASS 239

62 4,714,196
265.29 4,714,197
409 4,714,198
412 4,714,199
579 4,714,200

CLASS 240

544 4,714,226

CLASS 241

24 4,714,201
30 4,714,202
36 4,714,203
55 4,714,204
95 4,714,205
100 4,714,206
189 R 4,714,207

CLASS 242

25 R 4,714,209
55.3 4,714,210
84.52 B 4,714,208
96 4,714,211
182 4,714,212
198 4,714,213

CLASS 244

3.16 4,714,214
3.29 4,714,216
155 R 4,714,217
199 4,714,215

CLASS 248

62 4,714,218
65 4,714,219
160 4,714,220
221.1 4,714,221
282 4,714,222
291 4,714,223
465 4,714,224
523 4,714,225
595 4,714,227
608 4,714,228
610 4,714,229
613 4,714,230

CLASS 249

14 4,714,231
90 4,714,232

CLASS 250

205 4,714,823
211 R 4,714,824
213 A 4,714,826
213 VT 4,714,825
214 C 4,714,827
4,714,828
227 4,714,829
234 4,714,830
305 4,714,831
343 4,714,832
397 4,714,833
427 4,714,834
486.1 4,714,835
578 4,714,836

CLASS 251

14 4,714,233
129.17 4,714,234
288 4,714,235
315 4,714,236
330 4,714,237

CLASS 252

8.8 4,714,559
51.5 A 4,714,561
94 4,714,562
107 4,714,563
110 4,714,564
174.19 4,714,565
314 4,714,566
315.2 4,714,567
350 4,714,568
511 4,714,569
518 4,714,570

CLASS 254

93 R 4,714,238

CLASS 260

403 4,714,571

CLASS 264

3.4 4,714,572
37 4,714,573
45.1 4,714,574
46.4 4,714,575
46.5 4,714,576
46.6 4,714,577
255 4,714,578
328.6 4,714,579
516 4,714,580
553 4,714,581

CLASS 269

3 4,714,239

CLASS 271

3.1 4,714,240
4,714,241
100 4,714,242
171 4,714,243

CLASS 272

72 4,714,244
75 4,714,245
93 4,714,246
109 4,714,247

CLASS 273

1 G 4,714,249
1.5 A 4,714,248
32.5 4,714,250
72 R 4,714,251
171 4,714,252
228 4,714,253
249 4,714,254
4,714,255
392 4,714,256

CLASS 277

1 4,714,257
72 R 4,714,258
165 4,714,259
235 B 4,714,260

CLASS 280

7.1 4,714,261
95 R 4,714,262
111 4,714,263
456 R 4,714,264
491 D 4,714,265
604 4,714,266
615 4,714,267
646 4,714,268
683 4,714,269
690 4,714,270
707 4,714,271
4,714,272
789 4,714,273
801 4,714,274

CLASS 281

15 R 4,714,275

CLASS 283

63 R 4,714,276

CLASS 285

39 4,714,277
169 4,714,278
239 4,714,279
381 4,714,280

CLASS 289

1.5 4,714,281

CLASS 292

36 4,714,282
48 4,714,283
91 4,714,284
163 4,714,285
263 4,714,286

CLASS 293

102 4,714,287

CLASS 294

82.33 4,714,288
119.3 4,714,289

CLASS 296

210 4,714,290

CLASS 297

284 4,714,291
437 4,714,292

CLASS 299

12 4,714,293
39 4,714,294
4,714,295

CLASS 303

6 C 4,714,296
33 4,714,297
100 4,714,298
4,714,299
115 4,714,300
116 4,714,301

CLASS 305

35 EB 4,714,302

CLASS 307

289 4,714,837
427 4,714,838
441 4,714,839
443 4,714,840
455 4,714,841
477 4,714,842
491 4,714,843
494 4,714,844
496 4,714,845

CLASS 310

12 4,714,849
49 R 4,714,850
156 4,714,851
4,714,852
257 4,714,853
268 4,714,854
317 4,714,846
328 4,714,855
332 4,714,847
359 4,714,848

CLASS 312

7.1 4,714,303
214 4,714,304
306 4,714,305

CLASS 313

2.1 4,714,856
112 4,714,857
318 4,714,858

CLASS 315

39.67 4,714,859
111.01 B1 4,587,458
111.81 4,714,860
117 4,714,861
244 4,714,862
366 4,714,863

CLASS 318

52 4,714,864
563 4,714,865
636 4,714,866
696 4,714,867

CLASS 320

5 4,714,868

CLASS 322

20 4,714,869

CLASS 323

258 4,714,870
314 4,714,872
315 4,714,871

CLASS 324

57 N 4,714,873
65 R 4,714,874
73 PC 4,714,875
73 R 4,714,876
126 4,714,893
133 4,714,877
158 F 4,714,879
158 MG 4,714,878
258 4,714,880
303 4,714,881
307 4,714,882
309 4,714,883
4,714,884
312 4,714,885
316 4,714,886
322 4,714,887
326 4,714,888
366 4,714,889
454 4,714,890
459 4,714,891

CLASS 329

50 4,714,892

CLASS 330

258 4,714,895
260 4,714,894
261 4,714,896
288 4,714,897
298 4,714,898

CLASS 331

1 A 4,714,899
8 4,714,900
176 4,714,901

CLASS 332

7.51 4,714,902

CLASS 333

110 4,714,903
148 4,714,904
167 4,714,905
202 4,714,906

CLASS 335

45 4,714,907
212 4,714,908

CLASS 336

192 4,714,909

CLASS 338

21 4,714,910
195 4,714,911

CLASS 340

310 R 4,714,912
347 P 4,714,913
573 4,714,914
657 4,714,915
664 4,714,916
679 4,714,917
724 4,714,918
726 4,714,919
747 4,714,920
784 4,714,921
825 4,714,922
825.06 4,714,923
825.210 4,714,924
825.55 4,714,925
870.36 4,714,926

CLASS 342

160 4,714,927
174 4,714,928
439 4,714,929

CLASS 343

786 4,714,930

CLASS 346

75 4,714,931
4,714,932
108 4,714,933
140 R 4,714,934
4,714,935
4,714,936
4,714,937

CLASS 350

1.3 4,714,307
1.7 4,714,308
3.7 4,714,309
6.6 4,714,310
96.11 4,714,311
96.14 4,714,312
96.16 4,714,313
96.20 4,714,314
4,714,315
4,714,316
96.21 4,714,317
4,714,318
144 4,714,319
174 4,714,320
4,714,321
281 4,714,322
350 S 4,714,323
362 4,714,324
376 4,714,325
485 4,714,326
504 4,714,327
521 4,714,328

CLASS 351

158 4,714,329
239 4,714,330

CLASS 353

122 4,714,331

CLASS 354

21 4,714,332
64 4,714,333
76 4,714,334
173.1 4,714,938
214 4,714,335
246 4,714,336

CLASS 355

3 DR 4,714,337
3 FU 4,714,338
3 R 4,714,940
3 TR 4,714,939
8 4,714,941
14 R 4,714,942
27 4,714,943
55 4,714,944
69 4,714,945
75 4,714,946
95 4,714,947

CLASS 356

4.5 4,714,339
23 4,714,340
41 4,714,341
44 4,714,342
73.1 4,714,343
152 4,714,344
246 4,714,345
339 4,714,347
349 4,714,346
351 4,714,348
374 4,714,349

CLASS 357

22 4,714,948
23.13 4,714,949
30 4,714,950
67 4,714,951
75 4,714,952
81 4,714,953

CLASS 358

19 4,714,954
48 4,714,955
60 4,714,956
93 4,714,957
166 4,714,958
184 4,714,959
206 4,714,960
209 4,714,961
4,714,962
213.26 4,714,963
298 4,714,964
320 4,714,965
335 4,714,966

CLASS 360

48 4,714,967
51 4,714,968
66 4,714,969
73 4,714,970
77 4,714,971
97 4,714,972
133 4,714,973

CLASS 361

12 4,714,974
44 4,714,975
114 4,714,976
196 4,714,977
235 4,714,978
274 4,714,979
395 4,714,980
400 4,714,981
404 4,714,982

CLASS 362

27 4,714,983
101 4,714,984
154 4,714,985
267 4,714,986
352 4,714,987

CLASS 364

165 4,714,988
200 4,714,989
4,714,990
4,714,991
4,714,992
4,714,993
4,714,994
4,714,995
300 4,714,996
414 4,714,997
422 4,715,002
431.01 4,714,998
474 4,714,999
484 4,715,000
4,715,001
513.5 4,715,004
521 4,715,005
523 4,715,006
563 4,715,007
4,715,008
565 4,715,009
571 4,715,003
705 4,715,010
734 4,715,011
900 4,715,012
4,715,013

CLASS 365

185 4,715,014
210 4,715,015
229 4,715,016
239 4,715,017

CLASS 366

84 4,714,350

CLASS 367

19 4,715,018
31 4,715,019
38 4,715,020
41 4,715,021
83 4,715,022
144 4,715,023

CLASS 368

17 4,714,351
64 4,714,352

CLASS 369

44 4,715,024
75.2 4,715,025

CLASS 370

1 4,715,026
3 4,715,027
4,715,028
70 4,715,029
85 4,715,030
4,715,031
86 4,715,032
104 4,715,033

CLASS 371

21 4,715,034
23 4,715,035
37 4,715,036
43 4,715,037

CLASS 372

2 4,715,038
37 4,715,039
98 4,715,040

CLASS 373

72 4,715,041
74 4,715,042

CLASS 374

184 4,715,043

CLASS 375

8 4,715,044
58 4,715,045
61 4,715,046
84 4,715,047
100 4,715,048
106 4,715,049
111 4,715,050

CLASS 376

233 4,714,582
261 4,714,583
353 4,714,584
442 4,714,585

CLASS 377

45 4,715,051
108 4,715,052

CLASS 378

73 4,715,053
122 4,715,054
144 4,715,055
152 4,715,056
197 4,715,057

CLASS 379

27 4,715,058
53 4,715,059
70 4,715,060
91 4,715,061
390 4,715,062
4,715,063
392 4,715,064

CLASS 381

46 4,715,065

CLASS 383

117 4,714,353

CLASS 384

38 4,714,354
193 4,714,355
275 4,714,356
312 4,714,357
470 4,714,358
571 4,714,359
620 4,714,360

CLASS 400

144.2 4,714,361
4,714,362
322 4,714,363
639.1 4,714,364

CLASS 401

65 4,714,365

CLASS 402

13 4,714,366

CLASS 403

104 4,714,367
132 4,714,368
190 4,714,369
217 4,714,370
355 4,714,371
400 4,714,372
402 4,714,373

CLASS 404

91 4,714,374

CLASS 405

3 4,714,375
45 4,714,376
154 4,714,377
163 4,714,378
4,714,379
168 4,714,380
178 4,714,381
204 4,714,382

CLASS 407

42 4,714,383
103 4,714,384
119 4,714,385

CLASS 408

72 R 4,714,386

CLASS 409

51 4,714,387
146 4,714,388
233 4,714,389
234 4,714,390

CLASS 411

54 4,714,391
175 4,714,392

CLASS 414

10 4,714,393
41 4,714,394
114 4,714,395
161 4,714,396
222 4,714,397
503 4,714,398
621 4,714,399
751 4,714,400

CLASS 415

30 4,714,401
35 4,714,402
107 4,714,403
127 4,714,404
169 R 4,714,405
170 R 4,714,406
192 4,714,407

CLASS 416

91 4,714,408
134 A 4,714,409
193 A 4,714,410

CLASS 417

246 4,714,411
289 4,714,412
293 4,714,413

CLASS 418

11 4,714,414
14 4,714,415
63 4,714,416
159 4,714,417
201 4,714,418

CLASS 419

2 4,714,586
29 4,714,587

CLASS 420

534 4,714,588

CLASS 422

102 4,714,590
140 4,714,591
192 4,714,592
197 4,714,593
245 4,714,594
294 4,714,595

CLASS 423

10 4,714,596
228 4,714,597
230 4,714,598
290 4,714,599
319 4,714,600
329 4,714,601
369 4,714,602
432 4,714,603
488 4,714,604

CLASS 424

1.1 4,714,605
3 4,714,606
9 4,714,607
52 4,714,608
59 4,714,609
70 4,714,610
85 4,714,611
4,714,612
86 4,714,613
93 4,714,614
95 4,714,615

CLASS 425

126 S 4,714,419
161 4,714,420
192 R 4,714,421
204 4,714,422
376 R 4,714,423
388 4,714,424
461 4,714,425

CLASS 426

42 4,714,616
427 4,714,617
524 4,714,618
548 4,714,619
572 4,714,620

CLASS 427

2 4,714,621
11 4,714,622
27 4,714,623
34 4,714,624
35 4,714,625
39 4,714,589
49 4,714,626
53.1 4,714,627
4,714,628
138 4,714,629
207.1 4,714,630
250 4,714,631
255.1 4,714,632
282 4,714,633
409 4,714,634
421 4,714,635

CLASS 428

1 4,714,636
35 4,714,637
4,714,638
36 4,714,639
4,714,640
113 4,714,642
131 4,714,643
136 4,714,644
204 4,714,646
209 4,714,645
212 4,714,647
245 4,714,648
257 4,714,649
265 4,714,650
286 4,714,651
308.4 4,714,652
328 4,714,653
4,714,654
345 4,714,655
411.1 4,714,656
412 4,714,657
523 4,714,658
610 4,714,641
685 4,714,659
698 4,714,660

CLASS 429

14 4,714,661
27 4,714,662
101 4,714,663
105 4,714,664
192 4,714,665

CLASS 430

59 4,714,666
270 4,714,667
316 4,714,668
325 4,714,669
331 4,714,670
545 4,714,671

CLASS 431

132 4,714,426

CLASS 432

59 4,714,427

CLASS 434

43 4,714,428
198 4,714,429

CLASS 435

7 4,714,672
14 4,714,673
18 4,714,674
32 4,714,675
176 4,714,676
183 4,714,677
235 4,714,678
240.25 4,714,680
240.27 4,714,681
240.48 4,714,679

CLASS 436

10 4,714,682
547 4,714,683

CLASS 437

2 4,714,510
19 4,714,684
41 4,714,685
81 4,714,519
195 4,714,686
228 4,714,520

CLASS 439

15 4,714,430
212 4,714,431
271 4,714,432
310 4,714,433
395 4,714,306
488 4,714,434
496 4,714,435
497 4,714,436
595 4,714,437
610 4,714,438
627 4,714,439
676 4,714,440
842 4,714,441
844 4,714,442

CLASS 440

89 4,714,443

CLASS 446

61 4,714,444
74 4,714,445
311 4,714,446

CLASS 464

52 4,714,447
68 4,714,448
4,714,449
90 4,714,450

CLASS 474

28 4,714,451
49 4,714,452
112 4,714,453

CLASS 493

193 4,714,454
225 4,714,455

CLASS 494

36 4,714,456
37 4,714,457

CLASS 501

9 4,714,687

CLASS 502

33 4,714,688
54 4,714,689
64 4,714,690
152 4,714,691
261 4,714,692
4,714,693
304 4,714,694
339 4,714,695

CLASS 514

11 4,714,696
46 4,714,697
212 4,714,698
227 4,714,699
229 4,714,700
258 4,714,701
259 4,714,702
274 4,714,703
288 4,714,704
303 4,714,762
309 4,714,705
345 4,714,706
361 4,714,707
412 4,714,708
414 4,714,709
430 4,714,710
464 4,714,711
531 4,714,712
563 4,714,713
572 4,714,714

CLASS 521

54 4,714,715
80 4,714,716
131 4,714,717
134 4,714,718
163 4,714,719
171 4,714,720

CLASS 523

113 4,714,721
218 4,714,722

CLASS 524

11 4,714,726
42 4,714,723
100 4,714,724
108 4,714,725
271 4,714,727
272 4,714,728
281 4,714,729
321 4,714,730
459 4,714,731
474 4,714,732
493 4,714,733
496 4,714,734
514 4,714,735
608 4,714,736
611 4,714,737

CLASS 525

58 4,714,738
92 4,714,739
179 4,714,740
185 4,714,741
346 4,714,742
418 4,714,743
438 4,714,744
4,714,745
439 4,714,746

CLASS 526

64 4,714,747
255 4,714,748
290 4,714,749

CLASS 528

99 4,714,750
103 4,714,751
153 4,714,752
288 4,714,753
4,714,754
481 4,714,755
4,714,756

CLASS 530

329 4,714,757
354 4,714,758
391 4,714,759

CLASS 540

222 4,714,760
310 4,714,761

CLASS 544

31 4,714,763

CLASS 546

271 4,714,764

CLASS 548

183 4,714,765
217 4,714,766
344 4,714,767
435 4,714,768

CLASS 556

419 4,714,769
4,714,770

CLASS 558

102 4,714,771
240 4,714,772
338 4,714,773

CLASS 560

053 4,714,774
194 4,714,775

CLASS 562

460 4,714,776
506 4,714,777

CLASS 564

305 4,714,778
330 4,714,779
430 4,714,780

CLASS 568

319 4,714,781
347 4,714,782
424 4,714,783
492 4,714,784
614 4,714,785
633 4,714,786
697 4,714,787
4,714,788
807 4,714,789
4,714,790
913 4,714,791

CLASS 570

261 4,714,792

CLASS 585

4 4,714,793
26 4,714,794
328 4,714,796

CLASS 604

9 4,714,458
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